

**SCREENING SITE INSPECTION REPORT**

**of**

**GULFSTREAM AEROSPACE CORPORATION**  
**(OKD981518327)**

**Prepared By**

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**of**  
**GULFSTREAM AEROSPACE CORPORATION**

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## **1. INTRODUCTION**

The Region VI ARCS Contractor, MK-Environmental and ICF Technology (MK/ICF), was tasked by the U.S. Environmental Protection Agency (EPA) under ARCS Contract No. 68-W9-0025 to complete the Screening Site Inspection (SSI) of Gulfstream Aerospace Corporation (OKD981518327) in Bethany, Oklahoma County, Oklahoma, started under the FIT contract under Technical Directive Document (TDD) # F-06-9009-37.

### **1.1 SCREENING SITE INSPECTION OBJECTIVES**

The SSI evaluates the potential risks associated with hazardous waste generation, storage and disposal at the site. It expands upon data collected during the Preliminary Assessment (PA) and identifies data gaps. Information obtained during the SSI supports the management decision of whether the site proceeds to the Expanded Site Inspection (ESI) or receives the classification of No Further Action under the Superfund Amendments and Reauthorization Act (SARA).

## **2. SITE DESCRIPTION AND OPERATIONAL HISTORY**

This section addresses site location, operational history, source characterization, potential alternate sources and past or current regulatory status of the site.

### **2.1 SITE LOCATION**

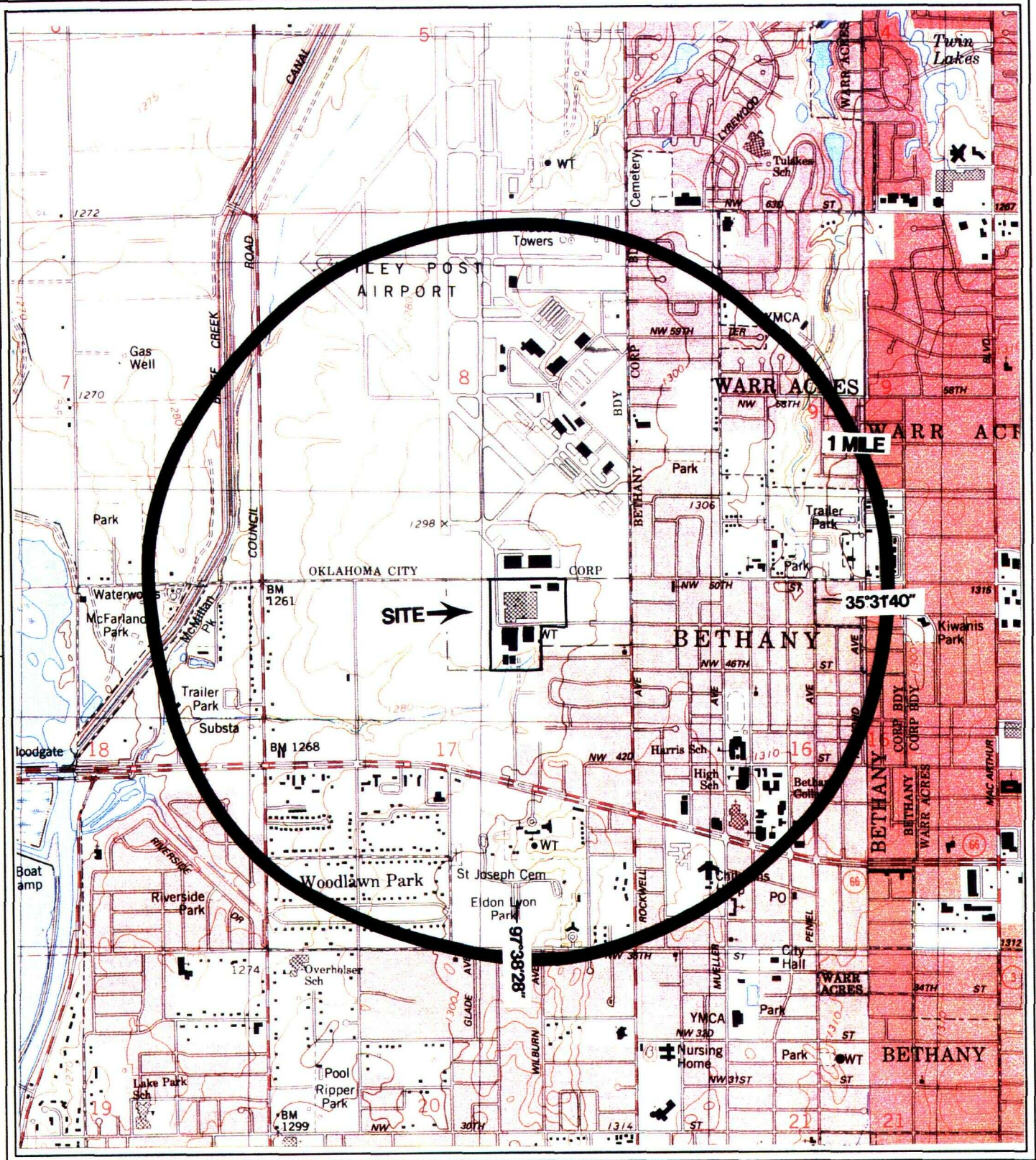
Gulfstream Aerospace Corporation (GAC) is located south of the Wiley Post Airport (OKD987070059) at 7400 N.W. 50th Street in Bethany, Oklahoma County, Oklahoma. The geographical coordinates are 35°31'40" north latitude and 97°38'28" west longitude (Figure 1) (Ref. 1). The site is located in a predominantly residential area on the west side of the Oklahoma City metroplex. Two known CERCLIS sites are located within 1 mile of the facility; the aforementioned Wiley Post Airport (OKD987070059) and Air Center, Inc. (OKD9807500319). Sampling by the EPA-FIT at the Air Center, Inc. site in January of 1988 indicated the presence of phenol and cyanide in both on-site and off-site soil and water samples and elevated levels of lead in the City of Bethany drinking water wells. On August 22, 1988 the FIT resampled the City of Bethany wells. During the August 22, 1988 trip, additional information was collected in an attempt to determine potential contributors of lead contamination. Information was collected by drive-bys of local industry and through contact with state officials. GAC was identified by the FIT as a potential contributing industry to the lead contamination (Ref. 34, pp. 1-2).

### **2.2 OPERATIONAL HISTORY**

The property is privately owned by the Chrysler Corporation (telephone 405-789-5000). The site contact is Mr. Bill Humes, Senior Vice-President of Operations (Ref. 2, p. 1). It is not known when the site began operations at this address.

GAC is a manufacturer of aircraft parts operating under generator status (Figure 2) (Ref. 2, p. 1). GAC reported to the Oklahoma State Department of Health (OSDH), Industrial and Solid Waste

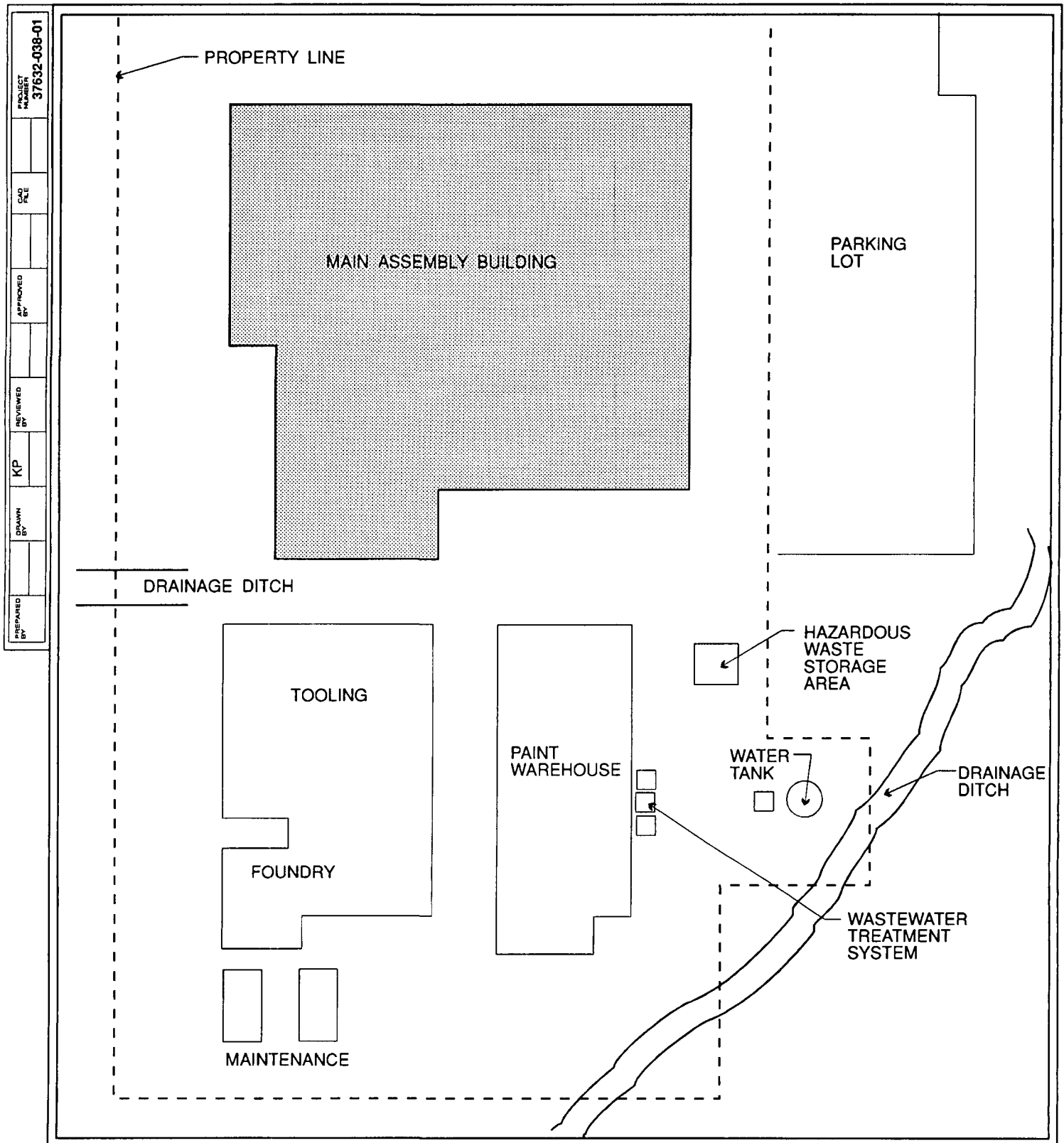




QUADRANGLE LOCATION

BETHANY, OK. 1986  
BRITTON, OK. 1986  
MUSTANG, OK. 1986  
OKLAHOMA CITY, OK. 1986





NOT TO SCALE

**FIGURE 2  
SITE SKETCH**  
GULFSTREAM AEROSPACE CORPORATION  
BETHANY, OKLAHOMA

CERCLIS #OKD981518327

Service, on September 6, 1985 as operating 12 different wastestreams involving corrosive, toxic and flammable wastes. All wastes are transported off-site for disposal or recycling (Ref. 3, pp. 1-2). The PA, completed by the FIT August 20, 1990, stated that chromium and lead were detected by the OSDH in on-site soil samples. Other potential contaminants of concern would be trichloroethylene, methyl ethyl ketone (barrel house), paint thinner, styrene, toluene (paint storage area) and a variety of waste stored in the hazardous waste storage area (Ref. 9, p. 5).

Ground water in Bethany is used for drinking and irrigation purposes. The surface water may be of concern because of runoff into Lake Overholser. Lake Overholser is used as a water supply and for recreational boating and fishing. The soil exposure pathway is of concern for on-site workers (Ref. 9, p. 5).

## **2.3 SOURCE EVALUATION**

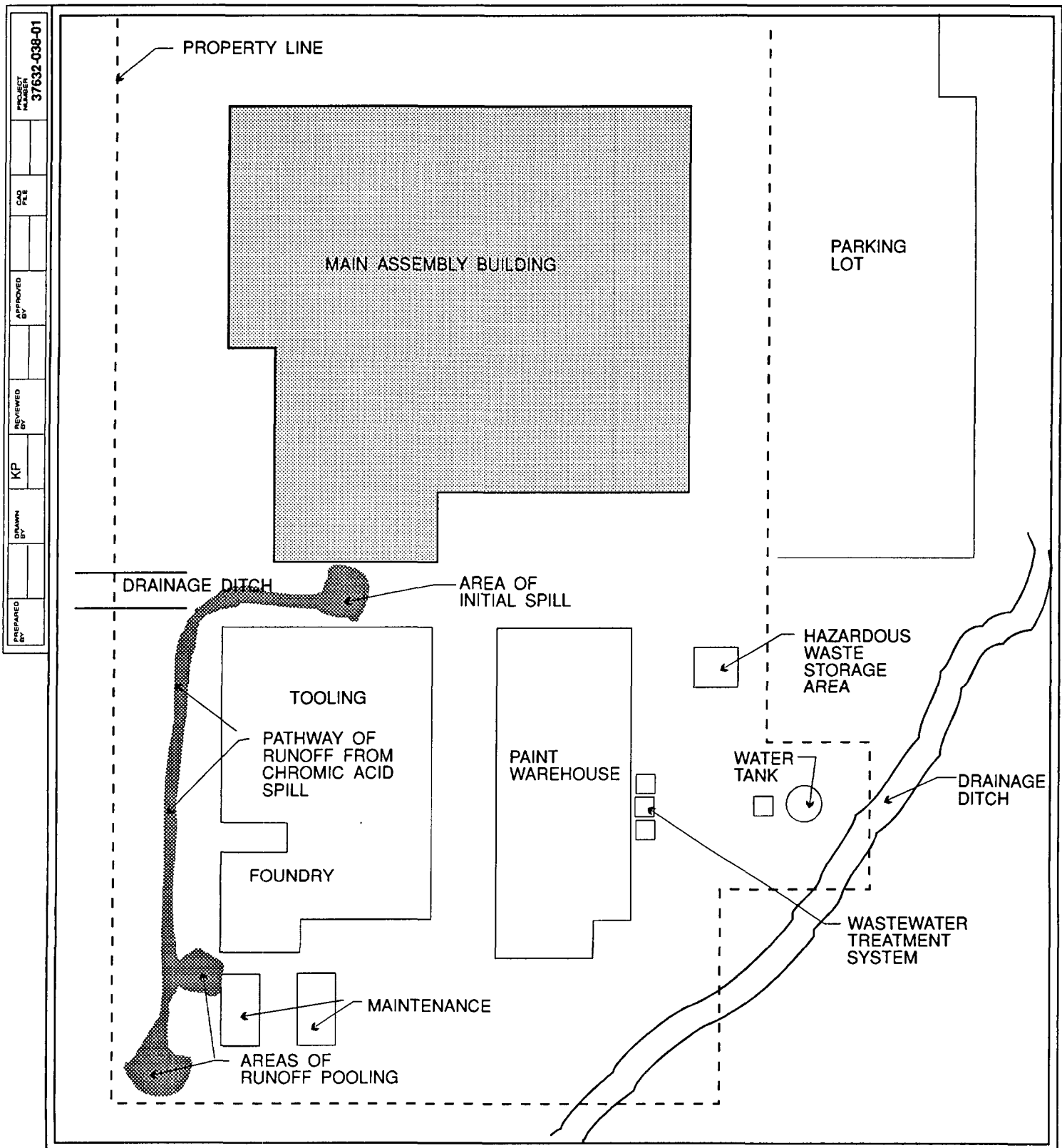
On May 22, 1986, GAC had a spill of chromic acid mixed with 30 gallons of hydrofluoric acid. This occurred while a 500-gallon acid holding tank was being moved out of the process area. Approximately 200 to 250 gallons of acid was lost by the time the leak was plugged (Figure 3) (Ref. 4, p. 1). After the initial spill, the remaining contents of the tank were pumped into another holding tank. A dam was built to stop runoff and three and one half bags of sodium bi-carbonate was put on the spill. Approximately 800 pounds of slate lime was also spread over the area later that same day. The soil in the contaminated area was scrapped off and placed into 3 dumpsters (Ref. 4, p. 2). After soil removal, the ground was sampled by composite soil samples every fifty feet along the spill area (Ref. 6, p. 5). Analyses of soils, in-situ, revealed 4,850 milligrams per kilogram (mg/kg) for lead and an EP toxicity value of 11970.00 micrograms per liter ( $\mu\text{g/l}$ ) (Ref. 5, p. 2). Chromium concentrations, in-situ, were 641.60 mg/kg with an EP toxicity value of 911  $\mu\text{g/l}$  (Ref. 5, p. 2). Manifests indicate that 53 drums of contaminated soil and rock were disposed by U. S. Pollution Control at the Lone Mountain Solvent Recovery Site, Waynoka, Oklahoma, on November 6, 1986 (Ref. 7, pp. 1, 4).

It was discovered during the sampling after the spill, that lead contaminated foundry sand had been previously dumped on the ground. The lead contaminated area was colored dark brown (Ref. 6, p. 5).

The exact dimensions in square feet or cubic yards is not known for the chromic acid spill or the area of foundry sand contamination.

In 1986, the facility indicated that it was in the process of cleaning out old chemical products and as a result had accumulated a large amount of waste (Ref. 6, p. 6). Hazardous wastes that remain on site in excess of 90 days as defined in 40 CFR 265, are located in a single designated area. Wastes are stored in 55-gallon drums on a bermed concrete floor. This hazardous waste storage area is approximately 750 square feet and is located at the southern end of the plant (Figure 2) (Ref. 6, p. 26).

Other areas of concern involving industrial chemicals and solvents are a barrel house and a paint storage area. A large amount of the chemicals used in the manufacturing process are stored in 55-gallon drums in the 20 x 40 feet back section of the flammable storage area. Approximately 3,500 gallons of a variety of chemicals are stored year-round. These chemicals include trichloroethylene, methyl ethyl ketone, liquid smut, de-oxidizers, lubricants and other chemicals.



N



NOT TO SCALE

**FIGURE 3**  
**RESIDUAL POOLING FROM**  
**CHROMIC ACID SPILL**  
GULFSTREAM AEROSPACE CORPORATION  
BETHANY, OKLAHOMA  
(May 22, 1986)

CERCLIS #OKD981518327

The paint storage area is a 40 x 40 feet area that shares a common wall with the barrel house operation. Large quantities of paint thinner, paints, primer, battery acid, styrene, toluene, sodium, silicate and rubber cement are stored (Ref. 6, p. 27).

These chemicals are used throughout the factory in various operations resulting in the generation of waste chemicals. Due to the quantities on hand in the facility, there is a potential for hazardous waste spills (Ref. 6, p. 28).

The process area consists mainly of a number of dip tanks for treating small airplane parts prior to painting. Metal parts are dipped into hydrofluoric acid, alkaline cleaner, sodium bi-chromate, chromate, nitric acid, an acidic deoxidizer, desmuter, chromic acid and cadmium plating. Approximately 12,000 gallons are stored in tanks of different sizes (Ref. 6, p. 28).

Outside of the tooling area, a variety of chemicals are stored and used on a bermed concrete pad. These chemicals include petroleum distillates, hydrofluoric acid, sulfuric acid, oil and deoxidizers. The area is approximately 80 square feet and contains approximately 1,400 gallons of chemicals (Ref. 6, p. 29).

Hazardous materials used in the fiberglass area are limited to resins which contain small quantities of styrene. One 55-gallon drum is used at a time and resin is directly withdrawn from the drum (Ref. 6, p. 28).

Spray painting occurs in the paint hangar and process area of the plant. Water wash ventilation systems are used in both areas to exhaust paint overspray and volatiles. Zinc-chromate based paint is used in the process area. Conventional paints are used in the spray painting hangar (Ref. 6, p. 30).

Waste water from GAC consists of both contact and non-contact process water and discharges into the Bethany municipal sanitary sewer system, ultimately being discharged into the North Canadian River, after treatment (Ref. 6, p. 31).

GAC reportedly operates seven underground storage tanks (UST) for the storage of jet fuel, unleaded gasolines and diesel fuels. Of these seven, three have been permanently closed. The remaining four are between 14 and 21 years old and have no leak detection/prevention equipment or practices in place (Ref. 8, pp. 1-5).

Table 1 and Figure 3 identify potential on-site contaminant source areas.

## **2.4 POTENTIAL ALTERNATE SOURCES**

ICF personnel conducted a review of the CERCLIS database, dated December 20, 1991 to identify CERCLA and NPL sites located within 4 and 5 miles, respectively, of the GAC property. The review revealed 10 CERCLIS sites located with a 4 mile radius and no NPL sites within a 5 mile radius of the facility. As previously stated, two CERCLA investigated sites are within 1 mile of the GAC facility (Ref. 39).

**TABLE 1****POTENTIAL ON-SITE CONTAMINANT SOURCES**

Source Type/Name	Location	Source Characteristics
Contaminated Soil/Chromic Acid Spill	West side of Process Bldg.	-Analytical evidence of hazardous substance migration -Previous removal action
Contaminated Soil/Foundry Sand	West side of Process Bldg.	-Analytical evidence of hazardous substance migration
Hazardous Waste Storage Area	South end of plant	-Bermed concrete floor -750 square feet -Hazardous waste/90 day accumulation point -Sump for collection to a 5,000 gallon overflow tank

Potential on-site contaminant sources were limited to those sources that could be considered as CERCLA eligible sources only. Materials, products or chemical storage areas were not included.



## **2.5 REGULATORY STATUS/ACTIVITIES**

An Industrial Waste Compliance Inspection was completed by the OSDH on July 11, 1985. The inspection and report indicated that GAC was in non-compliance standing with regards to hazardous waste container labeling, 90 day holding time violation on accumulated wastes and that accumulation times were not clearly indicated (Ref. 2, p. 5).

Additionally, a second inspection on July 11, 1986 reported seventeen areas of non-compliance concerning waste handling, storage and accumulation times, occupational health and safety and record keeping violations (Ref. 6, pp. 1-25).

The EPA-FIT conducted a PA for GAC on August 20, 1990 (Ref. 9).

On January 3, 1991, FIT members Robert Taaffe, Catherine Goetz and Don Hudnall, Jr. conducted an on-site inspection at GAC. This inspection provided sufficient information for development of a representative sampling plan. The FIT observed similar conditions to those described in past inspections, with the addition of an on-site runoff collection system with off-site effluent disposal. The site was dry and the weather extremely cold at the time of the inspection. The FIT did not see any areas of stained or discolored soil. The FIT did notice a residential area near the GAC hazardous waste storage area. In addition, the FIT examined the west side roadbed where the residue of the chromic acid spill was contained and observed that it has been covered with gravel (Appendix A) (Ref. 10).

During the inspection, the potential for an observed soil release, air release and the presence of air-borne contaminants was monitored with an HNu and a Rad-Mini for the detection of volatile organics or radiation. Monitoring did not indicate levels above background (Ref. 10).

GAC is surrounded by a 10 foot fence, with the main entrances on NW 50th Street. All gates are locked or manned by security personnel. The work areas on-site are contained within several large buildings. An aircraft taxiway is located on the east section. There are open fields on the east, south and west side of GAC (Ref. 10).

A wastewater treatment system on-site has a treatment capacity of 24 gallons per minute prior to discharge. Three storage areas are bermed and enclosed. A sump pump is located within the hazardous waste storage area. The materials from the sump pump are collected in a 5,000 gallon above ground tank. The facility also has two 5,000 gallon waste overflow holding tanks. The tanks generally store wastewater for treatment. An inspection of the hazardous waste storage area, located at the southeast corner of the plant, found the potential for chemical runoff into an adjacent ditch (Ref. 10).

## **3. ANALYTICAL RESULTS**

This section addresses previous and SI analytical results. FIT sample methodology will be discussed.

### **3.1 PREVIOUS ANALYTICAL RESULTS**

Previous analytical results presented by the Oklahoma State Department of Health involving the acid spill indicated concentrations of fluoride (28.80 mg/kg), cadmium (9.71 mg/kg) and chromium (1281.00 mg/kg) in removed soil that had been placed in holding bins prior to disposal. EP toxicity analyses of soils taken from this same area revealed concentrations of chromium at 26,800 µg/l (Ref. 5, p. 1). Total Metal Analyses of soil samples collected in-situ revealed concentrations of arsenic (11.87 mg/kg), cadmium (9.05 mg/kg), chromium (641.60 mg/kg) and lead (4850.00 mg/kg). EP toxicity analyses of soils, in-situ revealed concentrations of lead at 11,970 µg/l and chromium concentrations at 911 µg/l (Ref. 5, p. 2).

### **3.2 SAMPLING METHODOLOGY**

During the week of April 1, 1991, the FIT implemented the SSI sampling inspection work plan (Ref. 30). The objectives of the sampling mission were to determine the extent of the chromic acid spill, lead contamination and if off-site contaminant migration is occurring. A summary of the sample locations and rationale is included as Table 2.

Six low concentration, composite surface soil samples (0 to 6 inches) and three low concentration, composite subsurface soil samples (1 to 2 feet) were collected along the west side roadbed to determine the extent and depth of potential contaminants. Seven low concentration, grab sediment samples and one low concentration, composite subsurface soil sample were collected from drainage ditches both on and off-site and up and down-gradient to determine whether off-site contaminant migration is occurring. These soil samples are referred to as sediment samples due to their location in a non-perennial surface water runoff pathway. An additional low concentration, composite surface sample and subsurface sample and a low concentration, grab sediment sample were collected from an area east of the facility to serve as backgrounds for their respective matrices. The re-location of the background samples from an area north of NW 50th Street to the location east of the GAC facility was the only deviation from the workplan. Ground water and surface water samples were not collected (Figure 4) (Ref. 30).

All soil samples were collected, decontaminated and packaged according to FIT Field Sampling Standard Operating Procedures. All samples were shipped via Federal Express to their respective laboratories (Ref. 30).

All on-site activities were conducted according to the Site Safety Plan.

Photographs showing the sampling stations are attached as Appendix B. The Chemical Data Analysis is attached as Appendix C. Chain of custody records and Sample Receipts are attached as Appendix D. Federal Express Airbills are attached as Appendix E.

The initial Site Manager for GAC was Robert Taaffe, whose responsibilities included obtaining site access, directing and overseeing all on-site and off-site activities, and documenting and managing the collection of all samples. The current Site Manager is Kevin Jaynes.

The Site Safety Officer was Don Hudnall, Jr., who was responsible for developing and implementing the health and safety protocol during the site investigation. Four additional team members assisted with sampling, documentation, decontamination and sample packaging (Table 3).

**TABLE 2****SAMPLE LOCATIONS AND RATIONALE**

<b>Sample Number</b>	<b>Sample Location and Rationale</b>
1	Surface soil (depth 0-6 inches). Low concentration composite located at northern end of gravel road. <u>Rationale:</u> To determine if soil is contaminated with constituents attributed to the chromic acid spill.
2	Surface soil (depth 0-6 inches). Low concentration composite located on gravel road west of the tooling area. <u>Rationale:</u> To determine if soil is contaminated with constituents attributed to the chromic acid spill.
3	Surface soil (depth 0-6 inches). Low concentration composite located on gravel road west of the foundry. <u>Rationale:</u> To determine if soil is contaminated with constituents attributed to the chromic acid spill.
4	Surface soil (depth 0-6 inches). Low concentration composite located approximately 50 feet south of Station 3. <u>Rationale:</u> To determine if soil is contaminated with constituents attributed to the chromic acid spill. (QA/QC).
5	Surface soil (depth 0-6 inches). Low concentration composite located at the south end of the gravel road. <u>Rationale:</u> To determine if soil is contaminated with constituents attributed to the chromic acid spill.
6	Subsurface soil (depth 1-2 feet). Low concentration composite located at the south end of the gravel road. <u>Rationale:</u> To determine if subsurface soil is contaminated with constituents attributed to the chromic acid spill.
7	Subsurface soil (depth 1-2 feet). Low concentration composite located adjacent to Station 4. <u>Rationale:</u> To determine if subsurface soil is contaminated with constituents attributed to the chromic acid spill.
8	Subsurface soil (depth 1-2 feet). Low concentration composite located at the northern end of gravel road adjacent to Station 1. <u>Rationale:</u> To determine if subsurface soil is contaminated with constituents attributed to the chromic acid spill.
9	Subsurface soil (depth 1-2 feet). Low concentration composite located at the drainage ditch outflow on the west side of the site. <u>Rationale:</u> To determine if contaminants associated with the chromic acid spill and/or on-site constituents are migrating off-site through the drainage pathways.

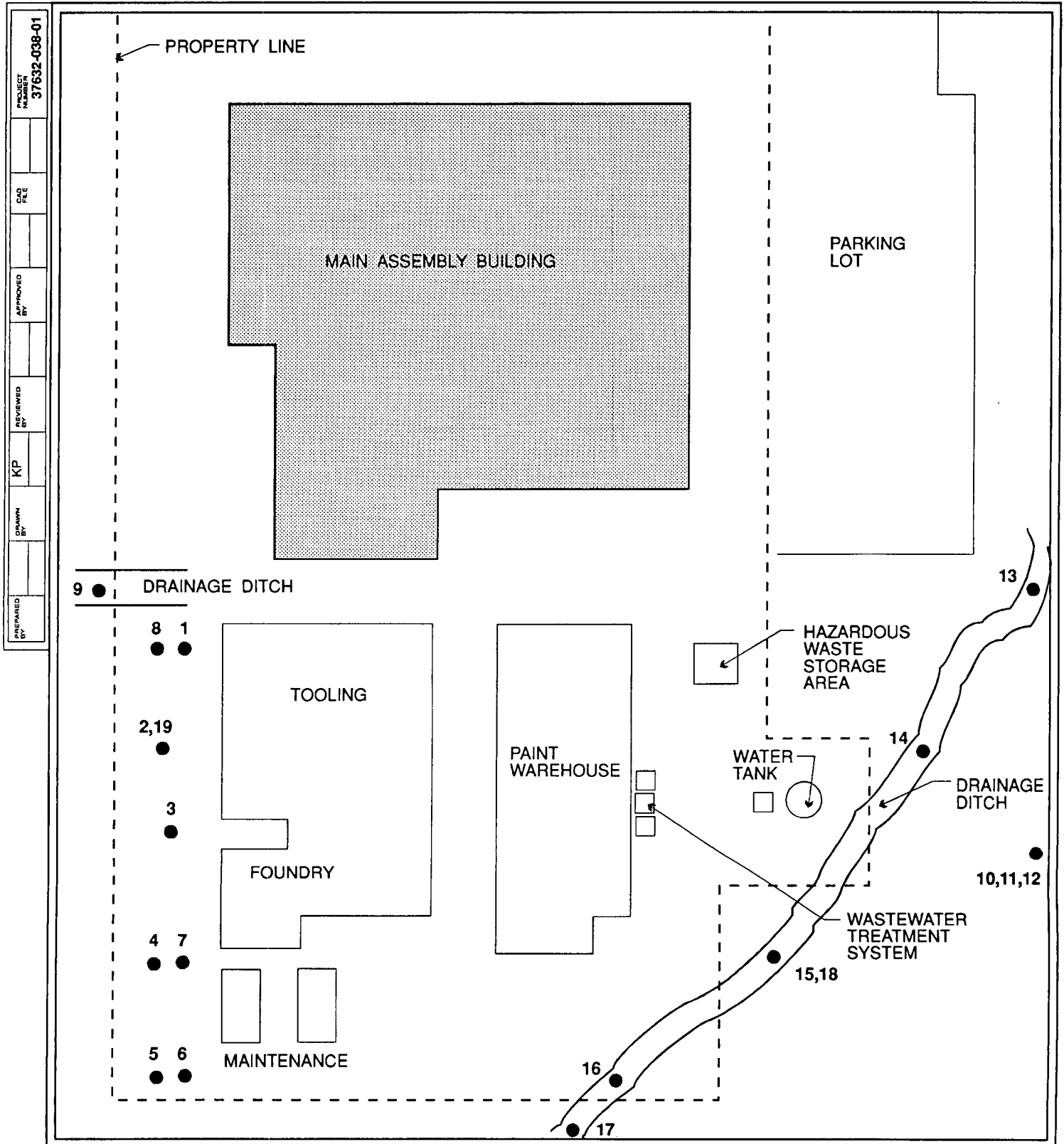
**TABLE 2****SAMPLE LOCATIONS AND RATIONALE (Cont.)**

<b>Sample Number</b>	<b>Sample Location and Rationale</b>
10	Surface soil (0-6 inches). Low concentration composite located east of the Gulfstream main facility. <u>Rationale:</u> This sample is designated as a background for surface soil sample.
11	Subsurface soil (depth 1-2 feet). Low concentration composite located east of the Gulfstream main facility. <u>Rationale:</u> This sample is designated as a background subsurface soil sample.
12	Sediment (depth 0-6 inches). Low concentration grab located in a drainage ditch east of the main facility. <u>Rationale:</u> This sample is designated as a background sediment sample for the hazardous waste area drainage ditch.
13	Sediment (depth 0-6 inches). Low concentration grab located at the drainage ditch in hazardous waste area in the southeast corner of site. <u>Rationale:</u> To determine if the sediment is contaminated with constituents attributed to the chromic acid spill.
14	Sediment (depth 0-6 inches). Low concentration grab located at the drainage ditch in hazardous waste area in the southeast corner of site. <u>Rationale:</u> To determine if the sediment is contaminated with constituents attributed to the chromic acid spill and/or site.
15	Sediment (depth 0-6 inches). Low concentration grab located at the drainage ditch in hazardous waste area in the southeast corner of site. <u>Rationale:</u> To determine if the sediment is contaminated with constituents attributed to the chromic acid spill and/or site.
16	Sediment (depth 0-6 inches). Low concentration grab located at the drainage ditch in hazardous waste area in the southeast corner of site. <u>Rationale:</u> To determine if the sediment is contaminated with constituents attributed to the chromic acid spill and/or site.
17	Sediment (depth 0-6 inches). Low concentration grab located at the drainage ditch west of the site. <u>Rationale:</u> To determine if contaminants associated with the hazardous waste area are migrating off-site.
18	Sediment (depth 0-6 inches). Low concentration grab located at the drainage ditch in the hazardous waste area at the southeast corner of the site. Duplicate of Sample 15. <u>Rationale:</u> To determine if the sediment is contaminated with constituents attributed to the chromic acid spill and/or site.

**TABLE 2**

**SAMPLE LOCATIONS AND RATIONALE (Cont.)**

<b><i>Sample Number</i></b>	<b><i>Sample Location and Rationale</i></b>
19	Surface soil (depth 0-6 inches). Low concentration composite located on the gravel road west of the tooling area. Duplicate of Sample 2. <u>Rationale:</u> To determine if soil is contaminated with constituents attributed to the chromic acid spill.



**FIGURE 4**  
**SAMPLE LOCATION MAP**  
**GULFSTREAM AEROSPACE CORPORATION**  
**BETHANY, OKLAHOMA**

CERCLIS #OKD981518327

**TABLE 3**

**SAMPLING MISSION PARTICIPANTS**

<b>TEAM MEMBER</b>	<b>DISCIPLINE</b>	<b>RESPONSIBILITY</b>
Robert Taaffe	Chemist	Team Leader
Don Hudnall	Toxicologist	Site Safety Officer
Jeff Patterson	Chemist	Sampler
Catherine Goetz	Geologist	Sampler/Documentation
Curtis Steger	Safety Technology	Sampler
Kevin Jaynes	Biologist	Sampler

### 3.3 SI ANALYTICAL RESULTS

The FIT conducted sampling at GAC during the week of April 1, 1991. There were only three deviations from the original workplan which involved the re-location of the three background samples (Stations 10, 11 and 12) to an area east of the GAC main facility (Figure 4) (Table 2).

Six low concentration soil composite samples (0-6 inches) were collected from the west side roadbed where the chromic acid spill had occurred. A background composite sample (Station 10) was collected from an area east of the main facility (Figure 4). Aluminum was detected at Stations 3 and 4 (18,700 ppm and 17,700 ppm) at concentrations greater than three times background (Station 10 - 4,880 ppm). Aluminum was also detected at concentrations above, but less than three times background at Stations 1, 2, 5 and 19. Barium was detected at Station 3 (168 ppm) at four times greater than background. Barium was also detected at concentrations above, but less than three times background at Stations 1, 2, 4, 5 and 19. Chromium was detected at Station 5 (79.70 ppm) at a concentration greater than 10 times background (6.70 ppm) and at Station 3 (20.90 ppm) at a concentration three times greater than background. Chromium was also detected at concentrations above, but less than three times background at Stations 1, 2, 4 and 19. Cobalt was detected at Station 3 (9 ppm) at a concentration three times greater than background (2.80 ppm). Lead was detected at Station 4 (297 ppm) at a concentration seven times greater than background (42.50 ppm). Lead was also detected at concentrations above, but less than three times background at Station 1 (Figure 4) (Table 4).

Three low concentration subsurface (1-2 feet) composite soil samples (Stations 6, 7 and 8) were also collected in the area where the chromic acid spill had occurred. A low concentration subsurface composite sample (Station 11) was also collected, collocated with Station 10, to serve as the background for the subsurface soil matrix. Aluminum was detected at Station 7 (15,100 ppm) at a concentration greater than three times background (4,400 ppm). Chromium was detected at Station 6 (30.20 ppm) at a concentration greater than five times background (6 ppm). Lead was detected at Station 7 (44.20 ppm) at a concentration greater than six times background (6.90 ppm). Lead was also detected at concentrations above, but less than three times background at Stations 6 and 8 (Figure 4) (Table 5).

A low concentration subsurface (1-2 feet) composite soil sample (Station 9) was collected from the drainage ditch on the west side of the site (Figure 4). Analysis revealed concentrations of aluminum (16,200 ppm) greater than three times background. Chromium was detected at Station 9 (487 ppm) at a concentration greater than 80 times background. Lead was detected (284 ppm) at a concentration greater than 41 times background. Magnesium was detected (3,920 ppm) at a concentration greater than five times background. Cadmium and silver were not detected in the background, but were detected at concentrations of 14.60 ppm and 202 ppm, respectively, at Station 9 (Figure 4) (Table 5).

Seven low concentration grab sediment samples were collected from a drainage ditch located south and east of the hazardous waste storage area and the paint warehouse. A low concentration grab sample (Station 12) was collected to serve as background for the sediment matrix. Chromium was detected at Station 13 (72 ppm) at a concentration greater than four times background (17.70 ppm). Chromium was also detected at concentrations above, but less than three times background at Stations 15 and 17. Lead was detected at Station 17 (170 ppm) and Station 18 (542 ppm) at concentrations greater than three and ten times background (48.20



**TABLE 4**  
**SURFACE SOILS (0-6 INCHES) ANALYTICAL RESULTS (ppm)**

Contaminant	Station 10 (Background)	Station 1	Station 2	Station 3	Station 4	Station 5	Station 19
Aluminum	4,880	8,500	11,100	18,700	17,000	8,010	7,540
Barium	41.60	49.90	82.9	168	117	67.80	76.20
Beryllium	ND	0.44	0.46	0.83	0.77	ND	0.47
Chromium	6.70	10.20	9.30	20.90	18.70	79.70	7.70
Cobalt	2.80	ND	ND	9	3.90	ND	ND
Lead	42.50	43.70	12.80	29.60	297	29.80	11.20
Nickel	ND	8.20	8	13.70	9.50	7.80	10.70
Vanadium	11.90	12.50	9.60	31.70	19.40	14.40	9.50

ND Not Detected  
\* Parts Per Million

TABLE 5

## SUBSURFACE SOILS (1-2 FEET) ANALYTICAL RESULTS (ppm)\*

Contaminant	Station 11 (Background)	Station 6	Station 7	Station 8	Station 9
Aluminum	4,400	10,000	15,100	3,070	16,200
Beryllium	ND	0.67	0.75	ND	ND
Cadmium	ND	ND	ND	ND	14.60
Chromium	6	30.20	15.80	4.50	487
Cobalt	ND	3.70	3	ND	ND
Lead	6.90	12.40	44.20	7.10	284
Magnesium	708	1,550	2,110	874	3,920
Silver	ND	ND	ND	ND	202
Vanadium	11	17	11	9.40	13.40

\* Parts Per Million

ND Not Detected

ppm), respectively. Cadmium was not detected in the background Station 12, but was detected at Station 17 (1.60 ppm). Cyanide was not detected in background, but was detected at Station 13 (1.80 ppm) (Figure 4) (Table 6).

Organic analysis of the sample collected at Station 9 revealed the presence of several polynuclear aromatics (PNAs) at concentrations ranging from greater than three to 500 times background. Station 9 was collected from the west side drainage ditch as runoff exits the site. Analyses of the sample collected at Station 9 revealed elevated concentrations of acenaphthene (270 ppm); phenanthrene (1,700 ppm); anthracene (370 ppm); pyrene (1,400 ppm); benzo(a)anthracene (480 ppm); benzo(b)fluoranthene (310 ppm); benzo(k)fluoranthene (340 ppm); and benzo(a)pyrene (300 ppm)(Appendix D). The presence of these PNAs when compared to documentation of known chemical products and wastes generated at GAC indicate that off-site contaminant migration is occurring. Concentrations of PNAs significantly elevated above background were also detected at Stations 13 and 18 (Figure 4) (Table 7).

#### **4. PATHWAY ASSESSMENT**

This section characterizes the environmental pathways and associated targets of potential contaminant migration from the facility.

##### **4.1 GROUND WATER**

###### **4.1.1 Ground Water Characteristics**

GAC is situated over consolidated sedimentary rocks (red beds) of Permian age and unconsolidated terrace deposits and alluvium of Quaternary age. In ascending order, the Permian rocks exposed in Cleveland and Oklahoma Counties are Wellington Formation, Garber Sandstone, Hennessey Shale, Duncan Sandstone and Chickasha Formation. The Garber and Wellington, because of their lithologic similarity, constitute a single aquifer system (Ref. 11, p. 18).

The principal source of ground water used for municipal and industrial purposes are the Garber Sandstone and Wellington Formation, both of which consist of lenticular beds of sandstone alternating with shale (Ref. 11, p. 3).

The Garber is approximately 350 feet thick in central Oklahoma County. The Wellington is approximately 500 feet thick in the outcrop area, but attains a thickness of 700 feet in the subsurface. Therefore, the two formations as a unit have a total thickness of 800 to 1,000 feet (Ref. 11, p. 21).

Wells obtain fresh water from the Garber Wellington at depths of 100 feet or less in the areas of outcrop, and at maximum depths of 1,000 feet in the Midwest City area. The approximate depth below land surface of the base of fresh water body is 800 feet in the Oklahoma City-Lake Hefner area (Ref. 11, pp. 29-30).

The Hennessey Shale consists of reddish-brown shale containing layers of siltstone and fine grained sandstone. The Hennessey Shale has a total thickness of 200 to 300 feet in the Oklahoma City area and less than 400 feet northwest of Lake Hefner (Ref. 11, pp. 21-22).

TABLE 6

## SEDIMENT ANALYTICAL RESULTS (ppm)\*

Contaminant	Station 12 (Background)	Station 13	Station 15	Station 17	Station 18
Cadmium	ND	ND	ND	1.60	ND
Chromium	17.70	72	21.50	41.40	17.60
Lead	48.20	18.40	22	170	542
Magnesium	3,130	2,720	992	4,460	4,270
Cyanide	ND	1.80	ND	ND	ND

\* Parts Per Million

ND Not Detected

TABLE 7

**ORGANIC ANALYTICAL RESULTS OF  
SURFACE/SUBSURFACE AND SEDIMENT SOILS (ppm)\***

CONTAMINANT	Station 4	Station 9	Station 10 (Background: Surface Soil)	Station 12 (Background: Sediment)	Station 13	Station 15	Station 16	Station 17	Station 18
Napthalene	ND	110.00	0.39 J	0.18 J	1.50	0.13 J	0.17 J	0.63 J	33.00
2-Methylnapthalene	ND	110.00	0.36 J	0.16 J	1.40	0.091 J	0.14 J	0.56 J	29.00
Acenaphthene	ND	270.00	0.65 J	ND	2.70	0.19 J	0.26 J	1.10	40.00
Dibenzofuran	ND	140.00	0.43 J	0.22 J	1.90	0.12 J	0.18 J	0.72 J	33.00
Fluorene	0.095 J	240.00	0.59 J	0.33 J	2.60	0.17 J	0.25 J	1.00	37.00
Phenanthrene	B	1,700.00	4.20	2.70	20.00 J	1.40	1.70	8.50	400.00
Anthracene	0.170 J	370.00	0.86	0.53 J	3.80	0.23	0.34 J	2.00	57.00
Fluoranthene	1.3	B	4.00	3.60	20.00	1.60	1.60	0.00	340.00
Pyrene	B	1,400.00	3.20	2.60	16.00	1.50	B	15.00	320.00
Benzo(a)anthracene	0.44 J	480.00	1.20	B	6.60	0.56 J	B	8.60	110.00
Chrysene	0.47 J	520.00	1.20	1.30	6.40	0.68 J	0.50 J	8.00	110.00
Benzo(b)Fluoranthene	0.45 J	310.00	0.77 J	0.99 J	5.50 J	0.53 J	0.33 J	ND	72.00
Benzo(k)Fluoranthene	0.32 J	340.00	0.71	0.81 J	4.30	0.68 J	0.48 J	14.00	43.00
Benzo(a)Pyrene	0.42 J	380.00	0.87	0.93 J	4.90	0.48 J	0.20 J	5.70	47.00
Ideno(1,2,3-CD)Pyrene	ND	300.00	60.00	ND	3.20	0.37 J	ND	ND	60.00
Benzo(G,H,I)Perylene	ND	250.0	56.00	ND	3.90	0.32 J	ND	ND	56.00

\* Parts Per Million  
 ND Not Detected  
 J Estimated Value  
 B Possible Laboratory Contaminant

Because of its lithology, the Hennessey Shale is poorly permeable; however, it is an aquifer that furnishes small quantities of water to rural domestic and stock wells (Ref. 11, p. 22). The Hennessey Shale acts as a confining layer for the Garber Wellington (Ref. 12).

The Chickasha and Duncan are rather impermeable and have little value as an aquifer. In general, the water is suitable for human consumption, but in some places contains too much dissolved gypsum or is too highly mineralized even for stock use (Ref. 11, p. 23). The Chickasha and Duncan, which conformably overlie the Hennessey Shale, are 150 to 200 feet thick and consist of sandstone, siltstone, siltstone conglomerate and shale (Ref. 11, p. 22).

The Quaternary terrace deposits consist of lenticular beds of sands, silt, clay and gravel (Ref. 11, p. 23). Replenishment of ground water in the terrace deposits comes mainly from infiltration of precipitation that falls on the terrace surface (Ref. 11, p. 25).

The terrace deposits on the upland between Lake Overholser and Lake Hefner, known locally as the Bethany terrace, is the source of ground water pumped by the City of Bethany (Ref. 11, p. 25).

The depth to water generally is less than 30 feet below land surface (Ref. 11, p. 25).

Along the Canadian and North Canadian Rivers, the alluvium is a band averaging approximately 2 miles in width. The alluvium consists mostly of lenticular beds of sand, silt and clay. The alluvium ranges in thickness from a few inches to approximately 90 feet (Ref. 11, p. 26). There is not a distinct separating layer between the terrace deposits and alluvium. A confining layer is not present between the surface and the terrace deposits and alluvium (Ref. 12).

Net precipitation for the Oklahoma City area is 7.09 inches (Ref. 13, p. 41).

Groundwater and drinking water samples were not collected during the FIT Site Investigation. Several heavy metals as well as several PNAs were detected in shallow subsurface soil samples on-site and in drainage pathways. There is the potential for shallow ground water contamination due to the presence of these heavy metals. An area of concern would be the relative proximity (0.5 to 2.5 miles) of several City of Bethany Municipal wells that are screened in the shallow alluvial and Quaternary terrace deposits, as well as several private domestic wells located around the site (Appendix C; Appendix F) (Tables 4-7) (Ref. 21).

#### **4.1.2 Ground Water Receptors**

The City of Bethany currently utilizes 27 wells for drinking water (Ref. 14). Twenty-four tap the unconsolidated alluvium and terrace deposits. The three remaining wells tap the Garber Wellington. Water from the alluvium wells is pumped to the water plant, blended and treated for hardness (Ref. 15). Water from the Garber Wells are chlorinated and pumped into the system (Ref. 14). Seven City of Bethany wells that tap the alluvium and one that taps the Garber Wellington lie within 0.5 to 1 mile of GAC (Appendix F) (Ref. 16). There are twelve City of Bethany wells that tap the alluvium and one that taps the Garber Wellington within the 1 to 2 mile distance radius and five wells that tap the alluvium and one that taps the Garber Wellington within the 2 to 3 mile radius (Appendix F) (Ref. 16, pp. 3-8). The City of Bethany Well No. 16 is no longer used by the City, but is now used by the Tri-City ballpark for its irrigation and sprinkler systems (Ref. 14).

Approximately 26,000 people are served by the City of Bethany water system (Ref. 17). The City of Bethany has no alternate source of drinking water (Ref. 18). The City of Bethany's corporate boundaries lie entirely within the 4-mile target distance limit (Appendix F).

The community of Bethany has not requested or delineated a wellhead protection plan. The state has adopted a 300 foot minimum setback requirement for wells (Ref. 38).

The City of Warr Acres lies within the 4 mile target distance limit (Appendix F). Drinking water for the City of Warr Acres is supplied by Oklahoma City (Ref. 19).

The Community of Silver Lake is located 3 to 4 miles north of GAC. Silver Lake operates two wells that are 600 feet and 635 feet deep. The wells extract water from 560 to 590 feet and from 418 to 635 feet, respectively, and tap the Garber Wellington (Ref. 20, pp. 1, 4-7). The well water from both the wells is mixed with 20% Oklahoma City water to dilute elevated levels of chromium, selenium, arsenic and zinc that occur naturally in the ground water (Ref. 20, p. 2, Appendix A). Oklahoma City is supplied by three reservoirs: Lake Hefner, Lake Overholser and Lake Draper (Ref. 17). In 1982, analytical results revealed the following: arsenic - 0.058 ppm, selenium - 0.086 ppm, chromium - 0.043 ppm and zinc - 0.151 ppm. In the mid 1980s, Silver Lake began buying treated water from Oklahoma City, which it blended in storage tanks (Ref. 20, Appendix A). Eighty-five families are served by the Silver Lake water system (Ref. 20, p. 1). The average number of residents per household in Oklahoma County is 2.45 (Ref. 32, p. 49). Given this calculation, approximately 208 people are served by the Silver Lake system. It is not known if the community of Silver Lake has a wellhead protection program. The state of Oklahoma has adopted a 300 foot minimum set back requirement for wells (Ref. 37).

On November 7, 1988, as a result of a citizen's complaint, the FIT sampled the Silver Lake wells. Analyses of the samples revealed the presence of arsenic, chromium and selenium at levels above the Primary Drinking Water Standards (PDWS) (Ref. 20, p. 3, Table 2).

As part of the Air Center, Inc. (OKD980750319) inspection, a well survey was conducted for a 3 mile radius. The Air Center, Inc. site is located on the Wiley Post Airport (Appendix F). GAC is located approximately 1 mile south of the Air Center, Inc. site and directly across the street from the airport. The survey revealed that there were 35 domestic, industrial and monitoring wells located within the 3 mile target distance (Ref. 21, pp. A1-A2). A review of this information and available well logs indicated that there were 22 domestic wells that tap the alluvium and quaternary terrace deposits and one well that is used by the Leibman Ice Company tapping the Garber Wellington Aquifer within the 4-mile target distance limit (Ref. 21, A1-A2).

## **4.2 SURFACE WATER**

### **4.2.1 Surface Water Characteristics**

GAC is situated over the Bethany silt loam, soil series. The Bethany series are naturally well drained with a 0 to 1% slope. Internal drainage is medium and permeability is slow. Water holding capacity is high (Ref. 22, p. 6).

Stormwater runoff from rooftops, parking lots and driveways exits the GAC facility in several locations where municipal streets and stormwater drainage systems collect and carry the runoff to the west of the plant (Ref. 6, p. 31).

Overland migration from the site is to the southwest via a drainage ditch entering the northeast corner of Lake Overholser, just south of the confluence of the Bluff Creek Canal, North Canadian River and Lake Overholser approximately 1.5 miles, west of the GAC facility (Appendix F). From the PPE, Lake Overholser comprises 1.8 miles of the downstream segment. The North Canadian River is considered the remaining 13.2 miles of the downstream segment (Appendix F). The drainage area, based on topographic maps is estimated to be greater than 1000 acres (Appendix F).

GAC and the community of Bethany are situated in an area considered to have no special flood hazard areas (NSFHA) and a flood map for the community has not been published (Ref. 25). The two year, 24-hour rainfall average is 3.5 to 4 inches (Ref. 26).

The average annual rainfall for Oklahoma City is 31.9 inches (Ref. 22, p. 1).

The flow rate for the North Canadian River at the gauging station located 0.5 miles downstream of Lake Overholser has an average discharge of 141 cubic feet per second (cfs) (Ref. 35, p. 300).

Bluff Creek Canal is a manmade, mostly concrete canal that runs from south to north connecting the North Canadian River to Lake Overholser and Lake Hefner (Appendix F) (Ref. 23; Ref. 24). Oklahoma City utilizes surface water from both of these reservoirs (Ref. 17).

#### **4.2.2 Surface Water Receptors**

An area of concern for the surface water pathway is that runoff from GAC enters Lake Overholser just south of its confluence with the North Canadian River and the Stinchcomb Wildlife Refuge, approximately 1.5 miles from the site (Appendix F). Water from the North Canadian River is diverted by floodgates via Bluff Creek Canal to replenish Lake Hefner or is diverted to replenish Lake Overholser. Lake Overholser is used for drinking water only in the summertime (Ref. 24). Average usage for Lake Overholser is 12 million gallons a day (mgd) and 25 mgd for Lake Hefner. Approximately 60 % of total water usage is from the North Canadian River via these two lakes. The total population served is 460,000 including the water usage from Lake Draper. Oklahoma City sells water to all other rural districts and does so at peak times of usage (Ref. 24).

The intake for Lake Hefner is located at the north end of the lake by the dam. Lake Hefner and Bluff Creek Canal are not considered to be in the down-gradient 15 stream mile target distance. The intake for Lake Overholser is located at the point where the North Canadian River exits the lake in the southeastern end approximately 1.8 miles downstream from the PPE (Appendix F) (Ref. 24). It is not known if there are any other surface water intakes on the North Canadian River within the 15 mile target distance. Table 8 describes the public water supply sources in the area.

A creel survey conducted for Lake Overholser in 1985-86 revealed that 179,236 pounds of sport and rough fish were taken for that year (Ref. 38).

There are no critical habitats in the Oklahoma City area, however; the Stinchcomb Wildlife Refuge is considered an important area for migratory birds and Least Terns have been seen foraging the



**TABLE 8****PUBLIC WATER SUPPLY SOURCES**

<b>City/Community</b>	<b>Potable Water Source</b>	<b>Blended System</b>	<b>Population Served</b>
City of Bethany	27 Groundwater Wells	Yes	26,000
Oklahoma City	3 Reservoirs: Lake Hefner, Lake Overholser, Lake Draper	Yes	460,000
Warr Acres	Oklahoma City	Yes	Unknown
Community of Silver Lake	2 Groundwater Wells	Yes 20% Oklahoma City	208

area (Ref. 27). The Least Tern is considered a federally threatened species in Oklahoma and can be found during the breeding season throughout the state, but only in a suitable habitat of bare ground on alluvial islands and sandbars (Ref. 28, pp. 113-114). Oklahoma County is also considered to be in the fall and spring migratory pathway for the federally endangered Whooping Crane (Ref. 28, pp. 113-114).

It is not known if there are any wetlands along the 15-mile downstream segment on Lake Overholser and the North Canadian River.

Another important area is the Rose Lake area. This is a privately owned area located at N.W. 50th and Sara Road, approximately 4 miles west of GAC. This area is approximately 100 to 200 acres and is considered important for migratory birds and Least Terns (Ref. 27).

Neither the Stinchcomb Wildlife Refuge or the Rose Lake area are considered federally or state sanctioned wetlands, but can be considered important wetland habitats for the Least Tern. The ownership and regulatory body for the refuge are not known (Ref. 27; Ref. 29).

Analyses of sediment samples collected from the west side drainage ditch and the drainage ditch located south and east of the hazardous waste storage area revealed the presence of several heavy metals and PNAs in concentrations ranging from three to 500 times their respective backgrounds (Appendix C) (Tables 6-7). An area of concern is that the runoff from the facility eventually enters Lake Overholser, which serves as one of three drinking water reservoirs for Oklahoma City (Appendix F) (Ref. 24).

#### **4.3 GROUND WATER RELEASE TO SURFACE WATER PATHWAY**

The depth to ground water is less than 30 feet below ground surface (Ref. 11, p. 25). Overland migration from the site is to the southwest via a drainage ditch entering the northeast corner of Lake Overholser approximately 1.5 miles west of the GAC facility, thus the nearest perennial surface water body is greater than 1 mile from the facility. The criteria for ground water to surface water pathway evaluation is not met. Further investigation including the analyses of ground water, surface water and comparable sediment samples would be required to determine if a release to this pathway is occurring.

#### **4.4 SOIL EXPOSURE PATHWAY**

An area of concern is the lead contamination from foundry sand and the reported chromic acid spill on May 22, 1986. This area is located on the west side of the facility (Figure 3) (Ref. 4, p. 1; Ref. 5, pp. 1-4; Ref. 6, p. 5). Analyses of surface and subsurface soil samples collected by the OSDH and the FIT revealed high concentrations of lead and chromium in surface (0-6 inches) and subsurface (1-2 feet) soils (Appendix C) (Tables 4-5) (Ref. 5, p. 1-5).

##### **4.4.1 Resident Threat Receptors**

Site accessibility is restricted by a 10 foot fence which surrounds the facility. The main entrances are on NW 50th Street and all gates are locked or manned by security personnel (Ref. 10).

There are no known critical habitats in the Oklahoma County area (Ref. 27). Oklahoma County is also considered to be in the fall and spring migratory pathway for the federally endangered Whooping Crane (Ref. 38, pp. 113-114).

There are 760 employees on-site (Ref. 30). It is not known if there are any residents on-site.

#### **4.4.2 Nearby Threat Receptors**

A house count was conducted within a 1 mile radius of the Wiley Post Airport Main Fuel Storage facility by the FIT on May 10, 1991 (Ref. 31, Attachment A). GAC is located approximately 0.5 miles south of this house count center (Appendix F). Approximately 2,400 homes were counted (Ref. 31, Attachment A). The average number of residents per household in Oklahoma County is 2.45 (Ref. 32, p. 49). Given this house count and the relative proximity of the central radii of the two sites, it can be calculated that the number of people living within 1 mile is 5,880. The estimated population residing within 0 to 1/4 mile is 1,470; from 1/4 to 1/2 mile, 1,470; from 1/2 to 1 mile, 2,940 (Ref. 31, Attachment A; Ref. 32, p. 49).

There are two schools and one college located within 1 mile, south of GAC (Appendix F). Further investigation would be required to determine the number of students attending these schools.

The nearest resident to these areas of contamination is to the southeast and is less than 500 feet. There are metropolitan residential areas to the south and east of GAC (Appendix F) (Ref. 10).

### **4.5 AIR PATHWAY**

#### **4.5.1 Air Pathway Characteristics**

The contaminants of concern would be PNAs and the potential of gas migration and the particulate migration of heavy metals associated with the lead and chromium contaminated areas. Air sampling was not conducted during the sampling event. Site conditions were monitored using an Hnu photoionization detector. Monitoring did not indicate organic vapor levels above background.

#### **4.5.2 Air Receptors**

Given the calculation of 5,880 people within the mile radius, or 3.14 square miles, there are approximately 1,873 people per square mile. Therefore, it can be estimated that with the 4 mile radius there are approximately 94,099 people (Appendix F) (Ref. 31; Ref 32, p. 49).

In comparison, the Geographical Exposure Modeling System (GEMS) was consulted to determine the population within 4 miles of the GAC facility. The database indicated that there are 109,136 people within the 4-mile target distance limit, based on the 1980 census information (Ref. 36). The population residing within 2 miles of GAC was reported to be 25,495; with 3 miles, 39,509; and within 4 miles an additional 39,920 (Ref. 36). ✓

The City of Bethany, whose corporate boundaries lie entirely within the 4 mile target distance limit, has a population of approximately 23,000 (Appendix F) (Ref. 33).

There are no critical habitats in the Oklahoma City area, however; the Stinchcomb Wildlife Refuge is considered an important area for migratory birds and Least Terns have been seen foraging the area (Ref. 27). The Least Tern is considered a federally threatened species in Oklahoma and can be found during the breeding season throughout the state, but only in a suitable habitat of bare ground on alluvial islands and sandbars (Ref. 28, pp. 113-114). Oklahoma County is also considered to be in the fall and spring migratory pathway for the federally endangered Whooping Crane (Ref. 28, pp. 113-114).

Another important area is the Rose Lake area. This is a privately owned area located at N.W. 50th and Sara Road, approximately 4 miles west of GAC. This area is approximately 100 to 200 acres and is considered important for migratory birds and Least Terns (Ref. 27).

Neither the Stinchcomb Wildlife Refuge or the Rose Lake area are considered federally or state sanctioned wetlands, but can be considered important wetland habitats for the Least Tern. The ownership and regulatory body for the refuge are not known (Ref. 27; Ref. 29).

There are no known uses of agriculture, silviculture or designated recreation areas within one-half mile of the GAC facility (Appendix F).

Approximately 23 schools are located within the 4-mile target distance limit (Appendix F). Further investigation would be required to determine the number of students attending.

The approximate acreage of wetlands identified within the 4-mile target distance limit is greater than 1,000 acres (Appendix F).

## **5. SUMMARY**

GAC is a manufacturer of aircraft parts operating under generator status. GAC reported to the OSDH as being involved in 12 different wastestreams involving corrosive, toxic and flammable wastes. All wastes are transported off-site for disposal or recycling.

On May 22, 1986, GAC had a spill of chromic acid mixed with 30 gallons of hydrofluoric acid. The soil in the contaminated area was scrapped off and the ground was sampled. Analyses indicated elevated levels of lead and chromium. It was discovered during the sampling after the spill that, lead contaminated foundry sand had been previously dumped on the ground. Manifests indicate that 53 drums of contaminated soil and rock were disposed by U.S. Pollution Control at the Lone Mountain Solvent Recovery Site.

A variety of chemicals are stored at GAC year-round. These chemicals include trichloroethylene, methyl ethyl ketone, liquid smut, de-oxidizers, lubricants, paint thinners, paints, primers, battery acid, styrene, toluene, sodium silicate and rubber cement. These chemicals are used throughout the facility in various processes and result in the generation of waste chemicals, and due to the quantities on hand, there is a potential for hazardous waste spills.

Analysis of samples collected by the FIT indicate that contaminant migration off-site is occurring via the west side drainage ditch as well as the drainage ditch located south and east of the hazardous waste storage area and the paint warehouse.

Seven City of Bethany wells that tap the shallow alluvium and one that taps the Garber Wellington Aquifer lie within 0.5 to 1 mile of GAC. There are twelve that tap the alluvium and one that taps the Garber Wellington within the 1 to 2 mile distance radius and five wells that tap the alluvium and one that taps the Garber Wellington within the 2 to 3 mile radius. Approximately 26,000 people are served by the City of Bethany water system. The City of Bethany has no alternate source of drinking water.

Ground water and drinking water samples were not collected during the FIT Site Investigation. Several heavy metals such as lead, chromium and cadmium as well as several PNAs were detected in shallow subsurface soil samples on-site and in drainage pathways. There is a potential for shallow ground water contamination. An area of concern would be the relative proximity of several City of Bethany wells that are screened in the shallow alluvial and Quaternary terrace deposits as well as several private domestic wells located near the site.

Analysis of sediment samples collected from the west side drainage ditch and the drainage ditch located south and east of the hazardous waste storage area revealed the presence of several heavy metals and PNAs in concentrations ranging from three to 500 times their respective backgrounds.

An area of concern for the surface water pathway is that runoff from GAC enters Lake Overholser just south of its confluence with the North Canadian River and Stinchcomb Wildlife Refuge, approximately 1.5 miles from the site. Lake Overholser is used for drinking water only in the summertime. The intake for Lake Overholser is located at the point where the North Canadian River exits the lake in the southeastern end. It is not known if there are any other surface water intakes on the North Canadian River with the 15 mile target distance.

The average number of residents per household in Oklahoma County is 2.45. Given this house count and the relative proximity of the central radii of the two sites, it can be calculated that the number of people living within 1 mile is 5,880. The estimated population residing within 0 to 1/4 mile is 1,470; from 1/4 to 1/2 mile, 1,470; from 1/2 to 1 mile, 2,940.

There are no critical habitats in the Oklahoma City area, however; the Stinchcomb Wildlife Refuge is considered an important area for migratory birds and Least Terns have been seen foraging the area. The Least Tern is considered a federally threatened species in Oklahoma and can be found during the breeding season throughout the state, but only in a suitable habitat of bare ground on alluvial islands and sandbars. Oklahoma County is also considered to be in the fall and spring migratory pathway for the federally endangered Whooping Crane.

Another important area is the Rose Lake area. This is a privately owned area located at N.W. 50th and Sara Road, approximately 4 miles west of GAC. This area is approximately 100 to 200 acres and is considered important for migratory birds and Least Terns.

During the course of the SSI, the following data gaps were recorded:

- The exact dimensions, in square feet or cubic yards, is not known for the chromic acid spill area or the area contaminated with foundry sand;
- The waste quantity stored in the hazardous waste storage area at any given time;

- When GAC began operations at the site;
- The number of students attending local schools;
- Whether or not the community of Silver Lake has a wellhead protection program;
- It is not known whether there are any areas considered as wetlands in the 15-stream mile target limit;
- If the lead contamination detected on-site at GAC is a contributing factor to the lead contamination detected in the City of Bethany's wells (No. 21 and 23) in January 1988.

## SSI DOCUMENTATION LOG SHEET

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SITE: GULFSTREAM AEROSPACE  
IDENTIFICATION NUMBER: OKD981518327  
CITY: BETHANY  
STATE: OKLAHOMA

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REFERENCE NUMBER	DESCRIPTION OF THE REFERENCE
1	U.S.G.S. 7.5 Minute Series Topographic Map. Bethany, Oklahoma, 1986. Britton, Oklahoma, 1986. Oklahoma City, Oklahoma, 1986. Mustang, Oklahoma, 1986.
2	Oklahoma Controlled Industrial Waste Compliance Inspection. Site Identification. Prepared by the Oklahoma State Department of Health. Gulfstream Aerospace. July 11, 1985.
3	Controlled Industrial Waste Generators Listing. Prepared by the Oklahoma State Department of Health. Gulfstream Aerospace. December 18, 1990.
4	Memorandum. Chemical Spill. From: Barbara Marrs, Supervisor-Industrial Relations, Gulfstream Aerospace. To: File. June 2, 1986.
5	Oklahoma State Department of Health Report and Analytical Data on Chromic Acid Spill at Gulfstream Aerospace. June 18, 1986.
6	Generators Supplemental Checklist. Gulfstream Aerospace. Prepared by the Oklahoma State Department of Health. July 11, 1986.
7	Letter. Manifest Request. From: W.S. Clements, Manager Safety, Gulfstream Aerospace. To: Robert Taaffe, FIT Chemist, ICF Technology, Inc. January 4, 1991. OKD981518327.
8	Description of Underground Storage Tanks. Gulfstream Aerospace. Prepared by TECHRAD Environmental Services. October 1990.
9	Preliminary Assessment of Gulfstream Aerospace, Corp. Prepared by ICF Technology, Inc. for EPA Region VI. August 20, 1990.
10	Memorandum. On-site Reconnaissance Inspection Observations. From: Catherine Goetz, FIT Geologist. To: File. October 2, 1991.

- 11 Wood, P.R., Burton, L.C. Ground Water Resources Cleveland and Oklahoma Counties. Oklahoma Geological Survey Circular 71. 1968.
- 12 Record of Communication. Ground Water Below the Wiley Post Airport. From: Heather Schijf, FIT Biologist, ICF Technology, Inc. To: Bob Thomas, Hydrogeologist, Oklahoma Water Resources Board. October 21, 1988. OKD987070059.
- 13 Letter. HRS Net Precipitation Values. From: Andrew M. Platt, Group Leader, MITRE Corporation. To: Lucy Sibold, U.S. Environmental Protection Agency. May 26, 1988. Attachments.
- 14 Record of Communication. Wells Locations. From: Kevin Jaynes, FIT Biologist, ICF Technology, Inc. To: Craig Davis, Bethany Water Plant. June 28, 1991. OKD987070059.
- 15 Record of Communication. Active Wells in Bethany, Oklahoma and Update of Previously Obtained Information. From: Dan Bridgeforth, Superintendent, The City of Bethany. To: Kevin Jaynes, FIT Biologist, ICF Technology, Inc. June 6, 1991. OKD987070059.
- 16 Letter. Well Information. From: Dan Bridgeforth, Superintendent, The City of Bethany. To: Heather Schijf, FIT Biologist, ICF Technology, Inc. OKD987070059.
- 17 Record of Communication. Water Source. From: Heather Schijf, FIT Biologist, ICF Technology, Inc. To: Dan Bridgeforth, Superintendent, The City of Bethany. April 16, 1987. OKD987070059.
- 18 Record of Communication. Alternate Source of Drinking Water. From: Heather Schijf, FIT Biologist, ICF Technology, Inc. To: Craig Davis, Bethany Water Plant. October 21, 1988. OKD987070059.
- 19 Record of Communication. Air Center Well Information. From: Ravinder Joesph, ICF Technology, Inc. To: City of Warr Acres. May 29, 1987. OKD980750319.
- 20 Site Inspection Report. Sampling Results for Samples Collected From the Community of Silver Lake Municipal Wells Near the Air Center, Inc. Site. Prepared by ICF Technology, Inc. for EPA Region VI. January 10, 1989.
- 21 Well Log Data for 3 Mile Radius Around Air Center, Inc. OKD980750319.



**SSI DOCUMENTATION LOG SHEET****CONTINUED**

- 22      Soil Survey Oklahoma County, Oklahoma. United States Department of Agriculture, Soil Conservation Service, in Cooperation with Oklahoma Agricultural Experiment Station. February 1969.
- 23      Record of Communication. City of Bethany Wells and Numbering System. From: Dan Bridgeforth, Superintendent, The City of Bethany. TO: Kevin Jaynes, FIT Biologist, ICF Technology, Inc. May 17, 1991. OKD987070059.
- 24      Record of Communication. Oklahoma City Reservoirs and Water Supply. From: Kevin Jaynes, FIT Biologist, ICF Technology, Inc. To: Patrick Yonikas, Oklahoma City Water Department. June 27, 1991. OKD987070059.
- 25      National Flood Insurance Program Community Status Book. Federal Emergency Management Agency. May 28, 1986.
- 26      Hershfield, David M. Rainfall Frequency Atlas of the United States. U.S. Department of Agriculture, Soil Conservation Service. Technical Paper Number 40. 1961.
- 27      Record of Communication. Stinchcomb Wildlife Refuge and Critical Habitats. From: Kevin Jaynes, FIT Biologist, ICF Technology, Inc. To: John Skeen, Oklahoma Wildlife Conservation Department. June 27, 1991. OKD987070059.
- 28      Endangered and Threatened Species of Texas and Oklahoma. U.S. Fish and Wildlife Service. 1987.
- 29      Record of Communication. Lake Overholser, Lake Hefner and Stinchcomb Wildlife Refuge. From: Kevin Jaynes, FIT Biologist, ICF Technology, Inc. To: Ken Morris, Oklahoma Water Resources Board. June 27, 1991. OKD987070059.
- 30      Memorandum. Screening Site Inspection of Gulfstream Aerospace Corporation. From: Kevin Jaynes, FIT Biologist, ICF Technology, Inc. To: File. October 2, 1991.
- 31      Memorandum. Continuing Research Investigation and File Check of Wiley Post Airport. From: Kevin Jaynes, FIT Biologist, ICF Technology, Inc. To: File. May 10, 1991.
- 32      Estimates of Households, for Counties: July 1, 1985. U.S. Department of Commerce, Bureau of the Census.

- 33 Record of Communication. Population of Bethany, Oklahoma. From: Robert Taaffe, FIT Chemist, ICF Technology, Inc. To: Paula Parker, Bethany Chamber of Commerce. August 3, 1990. OKD987070059.
- 34 Site Inspection Report. Resampling of Municipal Drinking Water Wells Located Near the Air Center, Inc. Site in Oklahoma City, Oklahoma. Prepared by ICF Technology, Inc. for EPA Region VI. October 24, 1988.
- 35 Water Resources Data Oklahoma Water Year 1990. U.S. Geological Survey Water Department Report OK-90-1.
- 36 U.S. Environmental Protection Agency, Geographical Exposure Modeling System (GEMS) Database, compiled from U.S. Census Bureau 1980 data, accessed March 19, 1992.
- 37 Record of Communication. Wellhead Protection Plan for Bethany, Oklahoma. From: Kevin Jaynes, Site Manager, ICF Technology, Inc. To: Bob Fabian, Oklahoma Water Resources Board. March 24, 1992.
- 38 Record of Communication. Creel Survey for Lake Overholser. From: Kevin Jaynes, Site Manager, ICF Technology, Inc. To: Bob Martin, Biologist, Oklahoma Fish and Wildlife Department. March 24, 1992.
- 39 U.S. Environmental Protection Agency, Region 6 CERCLIS Version 2.0 Master Listing OK. Run Date December 20, 1991.

## **APPENDIX A**

### **PHOTO-DOCUMENTATION: ON-SITE RECONNAISSANCE INSPECTION**

**RECEIVED**  
SUPERFUND

JUN - 4 1992

RECORDS  
CENTER

PHOTOGRAPH 1

Site Name: GULFSTREAM AEROSPACE CERCLIS: OKD981518327

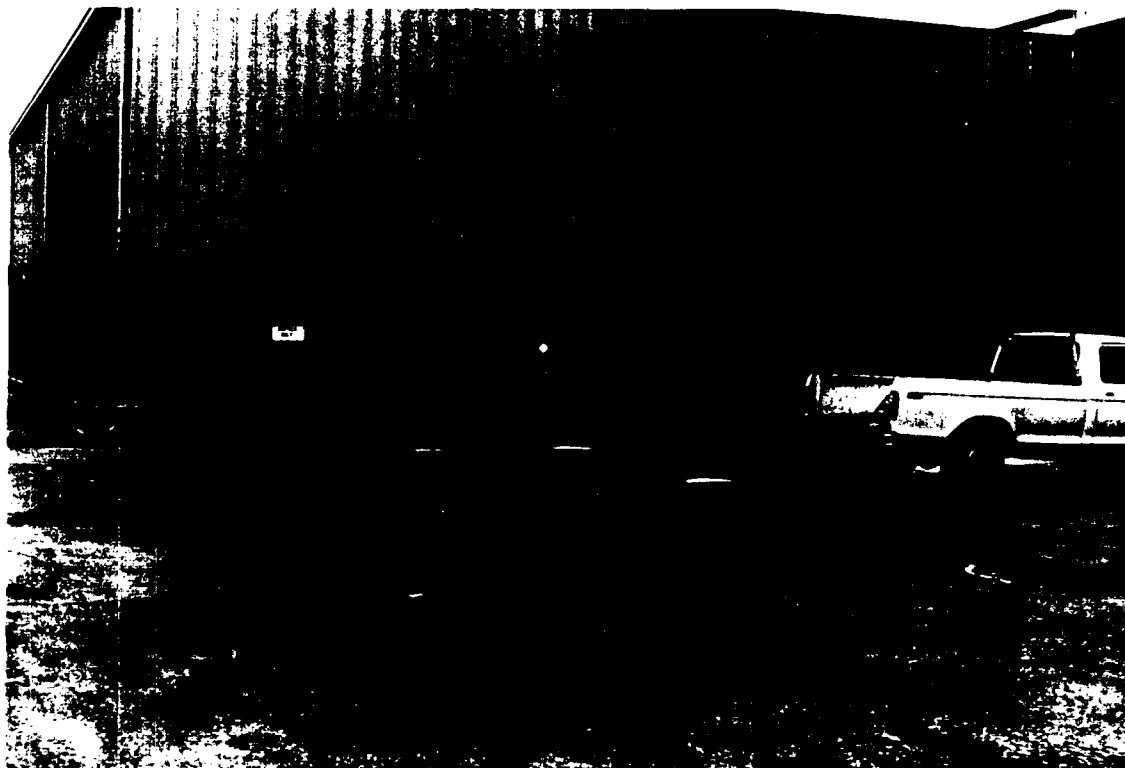
Location: Bethany, Oklahoma TDD Number: F-06-9009-37

Photographer: Robert Taaffe *RT* Witness: Don Hudnall *DH*

Date: 1-3-91 Time: 1430 Direction: Northwest

Comments: The photo shows the area behind the main manufacturing building where the hydrofluoric acid and chromic acid spill occurred.

(This photograph matches negative number 5)



PHOTOGRAPH 2

Site Name: GULFSTREAM AEROSPACE CERCLIS: OKD981518327

Location: Bethany, Oklahoma TDD Number: F-06-9009-37

Photographer: Robert Taaffe *RT* Witness: Don Hudnall *DH*

Date: 1-3-91 Time: 1440 Direction: West

Comments: The photo shows the area behind the main manufacturing building where the hydrofluoric acid and chromic acid spill occurred. The spill plume ran west towards the background in the photograph.

(This photograph matches negative number 7)



PHOTOGRAPH 3

Site Name: GULFSTREAM AEROSPACE CERCLIS: OKD981518327

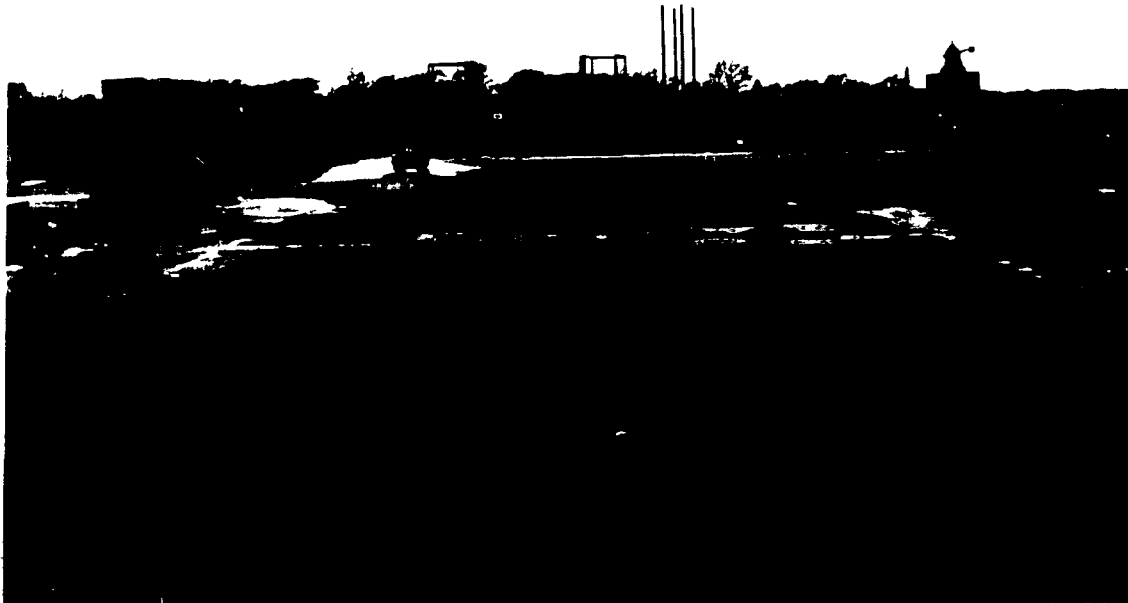
Location: Bethany, Oklahoma TDD Number: F-06-9009-37

Photographer: Robert Taaffe *RT* Witness: Don Hudnall *DH*

Date: 1-3-91 Time: 1550 Direction: West

Comments: The photo shows the western extent of the hydrofluoric acid and chromic acid spill. The spill plume ran south towards the left in the photograph.

(This photograph matches negative number 18)



PHOTOGRAPH 4

Site Name: GULFSTREAM AEROSPACE CERCLIS: OKD981518327

Location: Bethany, Oklahoma TDD Number: F-06-9009-37

Photographer: Robert Taaffe *RT* Witness: Don Hudnall *DH*

Date: 1-3-91 Time: 1600 Direction: Southwest

Comments: The photo shows the area where the hydrofluoric acid and chromic acid spill plume turned south. The road is gravel over dirt with no run-off containment system.

(This photograph matches negative number 19)



PHOTOGRAPH 5

Site Name: GULFSTREAM AEROSPACE CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-06-9009-37  
Photographer: Robert Taaffe *RT* Witness: Don Hudnall *over*  
Date: 1-3-91 Time: 1605 Direction: South

Comments: The photo shows the gravel road on the west side of the facility where the spill began to pool in several areas. The road is gravel over dirt with no run-off containment system.

(This photograph matches negative number 20)





PHOTOGRAPH 6

Site Name: GULFSTEAM AEROSPACE CERCLIS: OKD981518327

Location: Bethany, Oklahoma TDD Number: F-06-9009-37

Photographer: Robert Taaffe *RT* Witness: Don Hudnall *DH*

Date: 1-3-91 Time: 1450 Direction: North

Comments: Gravel road on the west side of the facility where the spill began pooling in several areas

(This photograph matches negative number 3)



PHOTOGRAPH 7

Site Name: GULFSTEAM AEROSPACE CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-06-9009-37  
Photographer: Robert Taaffe *RT* Witness: Don Hudnall *DH*  
Date: 1-3-91 Time: 1455 Direction: East

Comments: The photo is of the courtyard of the plant's foundary. The foundary is believed to be the source of lead contaminated sand. The grates in the center of the photo drain to the northwest of the site.

(This photograph matches negative number 2)



PHOTOGRAPH 8

Site Name: GULFSTEAM AEROSPACE CERCLIS: OKD981518327

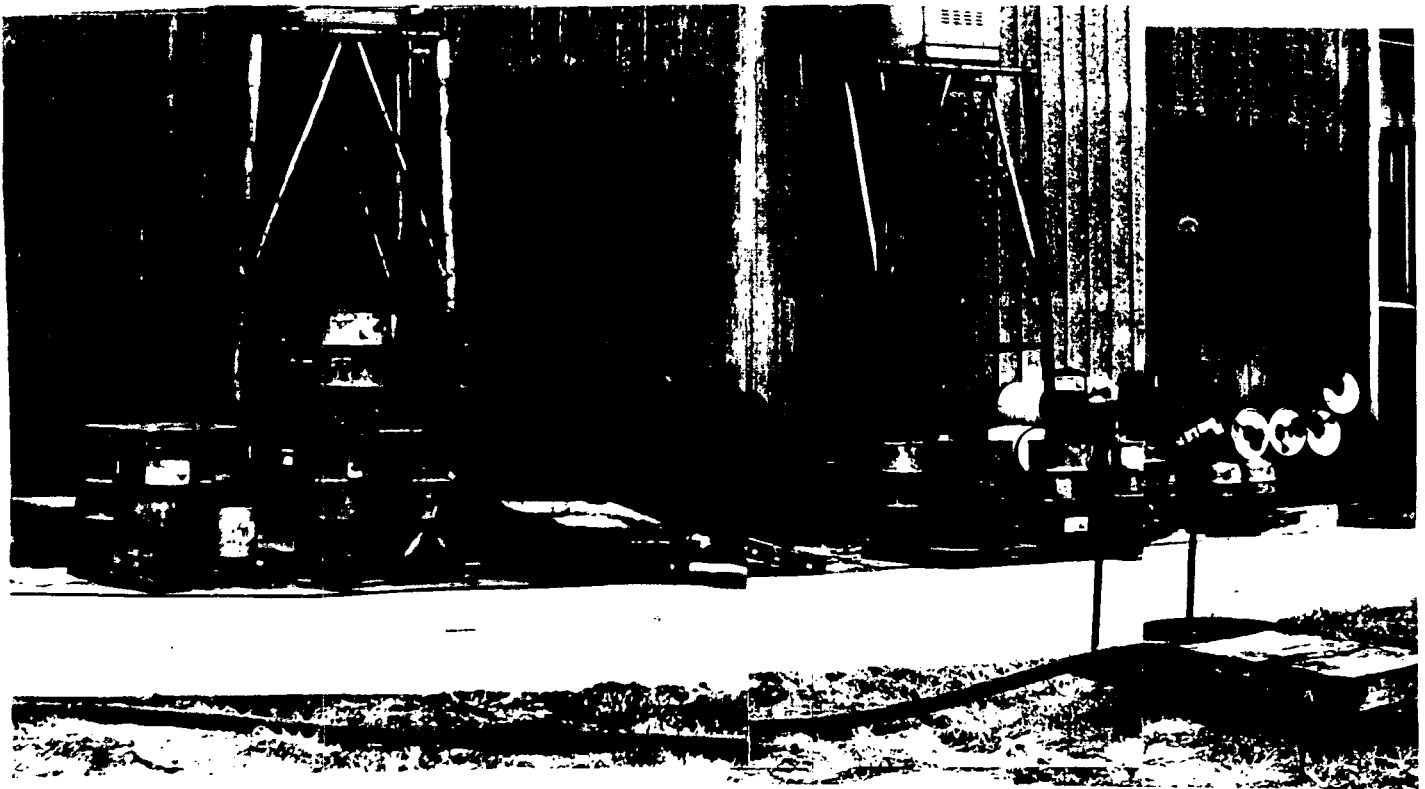
Location: Bethany, Oklahoma TDD Number: F-06-9009-37

Photographer: Robert Taaffe *RT* Witness: Don Hudnall *h/v*

Date: 1-3-91 Time: 1530 Direction: East

Comments: A panoramic photo of the plant's hazardous waste storage area. The barrels are stored here to be recycled by the chemical supplier. The area has no berm to control runoff. The hazardous waste storage area lies in front of a drainage ditch which flows into the Bethany Canal.

(This photograph matches negative number 10, 11, and 12)



PHOTOGRAPH 9

Site Name: GULFSTEAM AEROSPACE CERCLIS: OKD981518327

Location: Bethany, Oklahoma TDD Number: F-06-9009-37

Photographer: Robert Taaffe *RT* Witness: Don Hudnall *DH*

Date: 1-3-91 Time: 1540 Direction: East

Comments: A panoramic photo of the plant's hazardous waste storage shed. This covered area is used to store caustics and acids. The area is bermed, yet the sump pump was frozen during the reconnaissance. The large tank on the left is an acid overflow catch tank. The hazardous waste storage shed lies in front of a drainage ditch which flows into the Bethany Canal.

(This photograph matches negative number 15 and 16)



PHOTOGRAPH 10

Site Name: GULFSTEAM AEROSPACE CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-06-9009-37  
Photographer: Robert Taaffe *RT* Witness: Don Hudnall *DH*  
Date: 1-3-91 Time: 1515 Direction: North

Comments: A photo of the plant's on-site water and waste treatment system. The facility can handle 24 gallons per minute. All plating solutions and wastewater are treated here before release into the Bethany city sewers.

(This photograph matches negative number 9)



## **APPENDIX B**

### **PHOTO-DOCUMENTATION: SCREENING SITE INSPECTION**

PHOTOGRAPH 1

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *KS for RT* Witness: Curtis Steger *MS*  
Date: 4-2-91 Time: 1104 Direction: South-Southwest  
Comments: Photo of Station 8 on the westside roadway.

(This photograph matches negative number 2)





PHOTOGRAPH 2

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *KJ for RT* Witness: Curtis Steger *ms*  
Date: 4-2-91 Time: 1106 Direction: Downward  
Comments: Photo showing sample hole at Station 8. Note the trowel in hole to indicate scale and depth of hole.

(This photograph matches negative number 3)





PHOTOGRAPH 3

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *K360 RT* Witness: Curtis Steger *MS*  
Date: 4-2-91 Time: 1154 Direction: West  
Comments: Photo of Stations 2 and 19 on the westside roadway. The man in photo is Bill Clements, Safety Officer for GAC.

(This photograph matches negative number 4)



PHOTOGRAPH 4

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *KS for RT* Witness: Curtis Steger *CS*  
Date: 4-2-91 Time: 1216 Direction: South  
Comments: Photo of Jaynes collecting sample at Station 4 on the westside roadway. A drainage culvert can be seen in background.

(This photograph matches negative number 8)





PHOTOGRAPH 5

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *RTA* Witness: Curtis Steger *MS*  
Date: 4-2-91 Time: 1226 Direction: South-Southwest  
Comments: Photo showing Jaynes collecting sample at Station 7. A drainage culvert can be seen in the background.

(This photograph matches negative number 9)



PHOTOGRAPH 6

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *KS for RT* Witness: Curtis Steger *CS*  
Date: 4-2-91 Time: 1241 Direction: West  
Comments: A photo of Jaynes collecting station 3 on the westside roadway.

(This photograph matches negative number 12)

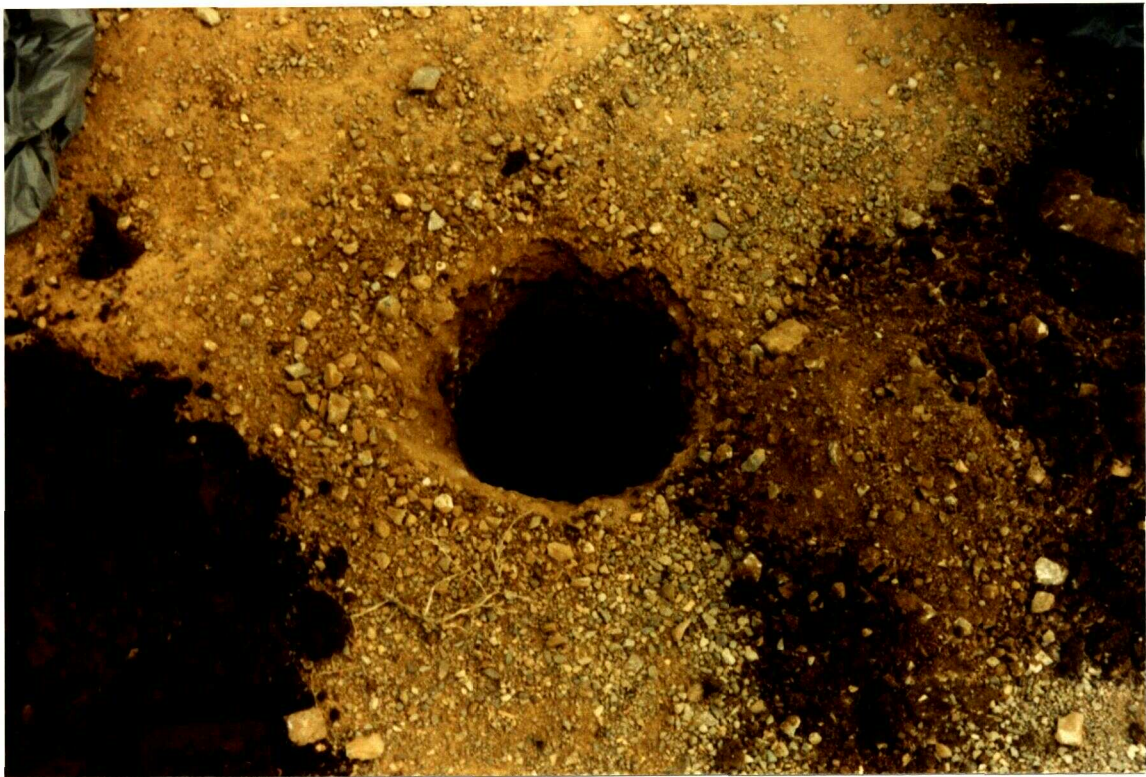




PHOTOGRAPH 7

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *RT* Witness: Curtis Steger *CS*  
Date: 4-2-91 Time: 1249 Direction: Downward  
Comments: Photo of Station 5, subsurface at the southern end of the westside road. The soil is a loam with dark brown, tan, and black layers.

(This photograph matches negative number 10)



PHOTOGRAPH 8

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *R Taaffe* Witness: Curtis Steger *CMS*  
Date: 4-2-91 Time: 1259 Direction: West  
Comments: Photo of Jaynes collecting Station 6 at the road split at the southern end of the westside roadway.

(This photograph matches negative number 11)





PHOTOGRAPH 9

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Catherine Goetz 113 Witness: Curtis Steger *Plus*  
Date: 4-3-91 Time: 1000 Direction: West  
Comments: A photo of Patterson collecting sample in drainage ditch, Station 13. The hazardous waste storage area is in the background.

(This photograph matches negative number 15)



PHOTOGRAPH 10

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *RT* Witness: Catherine Goetz *CG*  
Date: 4-3-91 Time: 1013 Direction: West

Comments: A photo of Patterson collecting Station 14. The sample location is where two drainage canals converge adjacent to the hazardous waste storage area. The wastewater treatment tanks are located in the background.

(This photograph matches negative number 16)





PHOTOGRAPH 11

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *K5 for RT* Witness: Catherine Goetz *1-7*  
Date: 4-3-91 Time: 1022 Direction: Northwest  
Comments: Photo of Patterson collecting sample at Station 15 on the east side of the southern drainage culvert.

(This photograph matches negative number 17)



PHOTOGRAPH 12

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *KJ for RT* Witness: Catherine Goetz */- 7-*  
Date: 4-3-91 Time: 1033 Direction: West

Comments: A photo showing Patterson collecting sample at Station 18. The sample location is in the drainage culvert at the north side of a heavy gate near the southern boundary of the property.

(This photograph matches negative number 18)





PHOTOGRAPH 13

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327  
Location: Bethany, Oklahoma TDD Number: F-6-9009-37  
Photographer: Robert Taaffe *Robert* Witness: Catherine Goetz *1-7*  
Date: 4-3-91 Time: 1042 Direction: Southwest

Comments: A photo of Patterson collecting Station 17 at the southern end of the drainage ditch. The fence marking the southern property line for Gulfstream Aerospace can be seen in the background.

(This photograph matches negative number 19)



PHOTOGRAPH 14

Site Name: Gulfstream Aerospace CERCLIS: OKD981518327

Location: Bethany, Oklahoma TDD Number: F-6-9009-37

Photographer: Robert Taaffe *KT for RT* Witness: Catherine Goetz *1-7*

Date: 4-3-91 Time: 1102 Direction: East

Comments: A photo of Patterson collecting Station 9 at the westside drainage ditch. The fence marking the western facility line for Gulfstream Aerospace can be seen in the background.

(This photograph matches negative number 20)



## **APPENDIX C**

### **CHEMICAL DATA ANALYSIS**



POOR QUALITY ORIGINAL

COVER SHEET

LABORATORY RESPONSE TO RESULTS OF  
CONTRACT COMPLIANCE SCREENING (CCS)

Response To: (Check one)

Organics CCS

☒ Inorganics CCS

Response materials should be sent to the attention of the CCS Coordinator.

Laboratory Name

KEYSTONE LAB - this to

Response Date

5-8-91

Date Screening

Results Received

at Laboratory

5-8-91

EPA Contract No.

68-D0-0147

Case No.

16177

SDG No.

MFN276

Sample Nos.

\*Only list sample numbers that require reconciliation.

This form is used to identify materials sent in response to results of Contract Compliance Screening (CCS). A separate form must accompany the response for each Case.

Please indicate (on the attached continuation form) which fractions and/or which criteria correspond with your resubmission. Response materials sent to CCS should also be copied to the Region and to EMSL/LV, each with this blue Cover Sheet.

[illegible]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TEXAS 77099

MEMORANDUM

Date: May 23, 1991

Subject: CLP Data Review

From: Mahmoud El-Feky, *M. El-Feky* Acting TPO, Region 6

To: Michael Daggett, Chief, Organic Section, Houston Branch  
Region 6

Attached is the data review summary for Case # 16177  
SDG # MFN276  
Site Gulf Stream Aero

Data was found: (X) Provisional  
( ) Unacceptable

Action required by TPO: ( ) Yes  
(X) No

COMMENTS:





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6

HOUSTON BRANCH

10625 FALLSTONE RD.

HOUSTON, TEXAS 77099

Ref. Case No. 16177

Site Name Gulf Stream Aero

Date: 5 / 23 / 91

Subject: CLP Data Review

From: Michael L. Daggett, Chief, Organic Lab Section; 6E-HL

To: E. Sierra, 6E-SH

A review of the laboratory raw data for the reference site has been completed by members of the Laboratory Section.

Samples were:

INORGANIC:	<u>MEN 276</u>	<u>MEN 809</u>		
	↓	<u>MEN 812</u>		
	↓	↓		
	<u>MEN 284</u>	<u>MEN 820</u>		
ORGANIC:				

The data was found:

- ( ) Acceptable
- (X) Provisional; use of data requires caution. Problems are noted in Review Summary.
- ( ) Unacceptable; data should not be used. Problems are noted in Review Summary.

Questions regarding the review can be addressed to me.

Attachments

cc: Mahmoud El-Feky, 6E-HL  
Mike Hiatt, EMSL/Las Vegas

# DATA QUALITY ASSURANCE REVIEW

SITE NAME GULFSTREAM AEROSPACE CORPORATION

SITE CODE OKD008155657

PAN FOK0360SAF

CASE NUMBER 16177

LABORATORY KEYSTONE LABORATORY

## SAMPLE NUMBERS

<u>MFN276</u>	<u>MFN282</u>	<u>MFN814</u>	<u>MFN819</u>
<u>MFN277</u>	<u>MFN283</u>	<u>MFN815</u>	<u>MFN820</u>
<u>MFN278</u>	<u>MFN284</u>	<u>MFN186</u>	
<u>MFN279</u>	<u>MFN809</u>	<u>MFN817</u>	
<u>MFN280</u>	<u>MFN812</u>	<u>MFN818</u>	
<u>MFN281</u>	<u>MFN813</u>		

REVIEWER ROBERT TAAFFE FIT ANALYST, EPA Region VI

*JA 9/25/91*

## DATA EVALUATION

SITE NAME GULFSTREAM AEROSPACE CASE NO. 16177 PAGE 1

Soil samples: MFN276, MFN277, MFN278, MFN279, MFN280, MFN281, MFN282, MFN283, MFN284, MFN809, MFN812, MFN813, MFN814, MFN815, MFN816, MFN817, MFN818, MFN819 and MFN820

The data package consisted of 19 soil samples analyzed for TAL metals and cyanide. Data qualifications are listed below.

### SOIL SAMPLES

1. Analytical Parameters: All samples were analyzed using low concentration protocols. Samples MFN276, MFN278, MFN280, MFN809, MFN813, MFN816 and MFN817 were analyzed at five fold dilutions to determine lead and detection limits for lead in these analyses are five times the low soil CRDL. Sample MFN282 was analyzed at a 10 fold dilution to determine lead and the detection limit for lead in this analyses is 10 times the low soil CRDL. Samples MFN279, MFN284 and MFN818 were analyzed at 20 fold dilutions to determine lead and detection limits for lead in these analysis are twenty times the low soil CRDL. Sample MFN819 was analyzed at a 50 fold dilution to determine lead. The detection limits for lead in this sample are fifty times the low soil CRDLs.

2. Blanks: Copper was detected in the calibration blank at a concentration less than its CRQL. Reported sample concentrations of copper less than 5 times its concentration in a calibration blank are considered possible laboratory contamination. Zinc was reported in the preparation blank at a concentration below its CRQL. Concentrations of zinc in all samples less than five times its preparation blank concentration are considered possible laboratory contamination.

The following parameters: holding times, calibration verification, laboratory control samples, ICP interference checks, ICP serial dilution, matrix spike recoveries, duplicates and Furnace AA QC were evaluated by the Houston EPA Laboratory and data qualifications for these parameters are listed in the attached review.

16177

Contract Laboratory Program  
REGIONAL/LABORATORY COMMUNICATION SYSTEM

## Telephone Record Log

Date of Call: 5-24-91Laboratory Name: KEYSTONE LAB - HOUSTONLab Contact: MARY F CRUZRegion: 6Regional Contact: VICTOR CHAPMANCall Initiated By:      Laboratory ☒ Region

In reference to data for the following sample number(s):

MFN 276, MFN 277, MFN 278, MFN 279, MFN 280, MFN 281, MFN 282, MFN 283  
MFN 284, MFN 809, MFN 812, MFN 813, MFN 814, MFN 815, MFN 816, MFN 817,  
MFN 818, MFN 819, MFN 820

Summary of Questions/Issues Discussed:

1. All the results on form 1 require "W" flag except MFN 279.
2. As in samples MFN 282 + MFN 817 require "W" flag.
3. As in samples MFN 809 requires a "W" and "M" flag.
4. TI in samples MFN 279 and MFN 813 require "W" flag.

Summary of Resolution:

1, 2, 3 + 4 See Revised Form 1's.

Mary F. Cruz  
Signature

6-1-91  
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

USE AND PROTECT FROM OTHERS  
PAGE 1 OF 14

Page 1 of 14

CONCENTRATIONS IN PARTS PER MILLION (PPM)  
Reported by Ecology & Environment, Inc.

## TRAFFIC REPORT NUMBER AND STATION LOCATION

Traffic Number	MFN276 - FP640	MFN277 - FP641	MFN278 - FP640	MFN279 - FP650	MFN280 - FQ103	MFN281 - FQ110	MFN282 - FQ111	MFN283 - FQ112	MFN284 - FQ113	MFN285 - FQ114
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Parent Station	11-3	11-3	11-3	11-3	11-3	11-3	11-3	11-3	11-3	11-3
Location	NORTH END	WEST OF	LOWER ROADWAY	NORTH OF	SOUTHERN END	SOUTH END OF	SUBSURFACE	NORTH END OF	WEST DRAINAGE	SURFACE SOIL
Address	11-3	11-3	11-3	11-3	11-3	11-3	11-3	11-3	11-3	11-3
Sample	11-3	11-3	11-3	11-3	11-3	11-3	11-3	11-3	11-3	11-3
Description	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5	STATION 6	STATION 7	STATION 8	STATION 9	STATION 10
Compound Name	CAS/SCAN	CLASS	1	2	3	4	5	6	7	8
ALUMINUM	7429-90-5	INO	8500	11100	10700	17000	10100	13100	10200	16200
ARSENIC	7440-38-2	INO	3	2.10	2.70	2.00	2.70	1.00	1.50	2.20
BARIUM	7440-39-3	INO	49.90	82.9	160	112	65.00	73.00	82.70	48.20
BERYLLIUM	7440-41-7	INO	0.44	0.46	0.83	0.77	0.67	0.75	0.75	0.75
CARBON	7440-42-9	INO								
CALCIUM	7440-47-1	INO	35400	4000	11000	12200	10000	1740	1150	47400
CHROMIUM	7440-47-3	INO	10.20	9.30	10.20	10.20	10.20	13.00	6.50	6.70
COPPER	7440-49-4	INO								
COBALT	7440-49-4	INO								
COPPER	7440-50-8	INO	16.90	167	18.00	17.00	1.00	1.00	1.00	1.00
IRON	7439-89-6	INO	6160	5250	15900	15500	7220	9400	4920	4910
LEAD	7439-92-1	INO	43.70	12.80	29.60	20	27.00	12.00	44.20	204
MAGNESIUM	7439-95-4	INO	8540	1370	3070	2720	1700	1550	1110	874
MANGANESE	7439-96-5	INO	83.8	60.60	464	76.20	89.30	100	100	144
MICEL	7440-02-0	INO	0.20	0	13.70	9.50	2.00	6.50	13	13
POTASSIUM	7440-09-7	INO	783	518	2310	1520	110	110	110	470
SILVER	7440-22-4	INO								
SODIUM	7440-20-5	INO	100	70.10	177	113	312			154
VANADIUM	7440-22-5	INO	12.50	9.60	31.20	19.40	14.00	10.00	10.00	11.00
ZINC	7440-22-5	INO	45.80	60.40	54.10	84	22.50	11.00	11.00	27
CYANIDE		INO								
ACETONE	67-64-1	VOA	0.02800	0	0.03500	0	0.11000	0	0.03000	0
PHENOL	108-95-2	ADN								
BENZYL ALCOHOL	103-30-1	ADN								
2-METHYLPHENOL	95-46-7	ADN								
4-METHYLPHENOL	105-84-5	ADN								
2,4-DIMETHYLPHENOL	135-15-9	ADN								
NAPHTHALENE	91-20-3	ADN	1.09600	1						
2-METHYLNAPHTHALENE	91-57-6	ADN	0.08500	1						
1-METHYLNAPHTHALENE	91-10-3	ADN			0.34000	1				
ACENAPHTHYLENE	123-10-6	ADN								
ACENAPHTHENE	83-32-7	ADN				0.08500	1	0.08400	1	270.00000
1-BENZOFURAN	122-34-3	ADN	0.10000	1						100.00000
FLUDRENE	84-72-7	ADN	0.15000	1	0.09500	1	0.07400	1		240.00000
PHENANTHRENE	85-01-6	ADN	1.10000	1	0.84000	1	0.51000	1	0.35000	1
ANTHRACENE	120-12-7	ADN	0.22000	1	0.17000	1	0.09000	1	0.11000	1
DI-N-BUTYLPHthalate	84-74-2	ADN								
FLUDRANTHENE	120-12-7	ADN	1.00000	1	1.30000	1	0.51000	1	0.40000	1
PYRENE	129-00-6	ADN	0.62000	1	0.98000	1	0.46000	1	0.35000	1
BUTYLBENZYLPHthalate	103-12-7	ADN	0.09300	1						
BENZO(a)ANTHRACENE	125-52-5	ADN	0.32000	1	0.08100	1	0.44000	1	0.17000	1

VOA - VOLATILE ADN - ACID/BASE NEUTRAL TEST - PESTICIDE FOR INDO - INORGANIC 1 - TARGET COMPOUND LIST COMPOUND (TEL)

2 - TENTATIVELY IDENTIFIED COMPOUNDS (TEL) H - HOUSTON LABORATORY ANALYTE X - OTHER ANALYTE

3 - ESTIMATED CONCENTRATION (TEL) LESS THAN (TEL) OF (TEL) WITH (ADN) OUT OF CONTROL LIMITS) C - MS CONFIRMATION

4 - DATA FOR ANALYTE IS UNUSABLE B - POSSIBLE LABORATORY CONTAMINANT U - UNDETECTED P - PESTICIDE ID QUESTIONABLE

\*PACIFIC REPORT NUMBER AND STATION LOCATION

VDA - VOLATILE ADW - ACID/BASE/NEUTRAL PES - PESTICIDE/FEED IMD - INORGANIC I - TARGET COMPOUND LIST COMPOUND (ECL)  
Z - TENTATIVELY IDENTIFIED COMPOUND (ECL) H - HOUSEHOLD LABORATORY ANALYTE Y - OTHER ANALYTE  
R - ESTIMATED CONCENTRATION (ECL, IEL LESS THAN CBL, OR TEL WITH 04/90 OUT OF CONTROL LIMITS) C - MS CONFIRMATION  
J - DATA FOR ANALYTE IS SUSPECTABLE P - POSSIBLE LABORATORY CONTAMINANT U - UNDETECTED Q - PESTICIDE IS QUESTIONABLE

Sample Number	FW275 - FF640	FW277 - FF641	FW278 - FF642	FW279 - FF650	FW280 - FQ103	FW281 - FQ110	FW282 - FQ111	FW283 - FQ112	FW284 - FQ113	FW285 - FQ114
Material	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Percent Moisture	11.1 - 9	10.5 - 11	11.5 - 14	13.0 - 13	11.3 - 10	13.3 - 13	10.9 - 12	12.1 - 9	38.7 - 29	3.0 - 3.0
Location	NORTH END	WEST OF	LOWER ROADWAY	NORTH OF	SOUTHERN END	SOUTH END OF	SUBSURFACE	NORTH END OF	WEST DRAINAGE	SURFACE SOIL
Access	OFF ROAD	TOOLING AREA	SOUTH OF FOUN.	SOUTHERN	OF WEST ROAD	ROAD SURFACE	WORTH OF	ROAD SUBSURFACE	DITCH	BACKGROUND
Sample	ON ROAD	ON ROAD	AT ROADSPILT	DRAINAGE	SURFACE	!	SOUTHERN DRAIN	!	!	!
Restriction	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5	STATION 6	STATION 7	STATION 8	STATION 9	STATION 10

[illegible][illegible]

Page 4 of 14  
 CONCENTRATIONS IN PARTS PER MILLION (ppm)  
 Compiled by: Ecology & Environment, Inc.

TARGET REPORT NUMBER AND STATION LOCATION

Target Report Number	Station Location	MFN276 - FP640	MFN277 - FP641	MFN278 - FP640	MFN279 - FP650	MFN280 - FQ103	MFN281 - FQ110	MFN282 - FQ111	MFN283 - FQ112	MFN284 - FQ113	MFN289 - FQ114
Material	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Percent Moisture	12.1 - 7	10.5 - 11	11.5 - 14	13.0 - 13	11.3 - 10	13.3 - 13	10.9 - 12	12.1 - 9	38.7 - 25	3.9 - 3.0	
Location	NORTH END	WEST OF	LOWER ROADWAY	NORTH OF	SOUTHERN END	SOUTH END OF	SUBSURFACE	NORTH END OF	WEST DRAINAGE	SURFACE SOIL	
Area ID	OF ROAD	TOOLING AREA	SOUTH OF FOUN.	SOUTHERN	OF WEST ROAD	ROAD SURFACE	NORTH OF	ROAD SUBSURFAC	DITCH	BACKGROUND	
Sample	ON ROAD	AT ROAD SPLIT	DRAINAGE	SURFACE			SOUTHERN DRAIN				
Description	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5	STATION 6	STATION 7	STATION 8	STATION 9	STATION 10	
Compound Name	245/SCAM	CLASSE									
UNKNOWN	291	ARM/2	3.00000	2							
UNKNOWN	294	ARM/2	1.70000	2							
UNKNOWN	293	ARM/2	2.00000	2							
UNKNOWN	291	ARM/2	7.50000	2							
DODECANARIDE	292	ARM/2	0.30000	2							
UNKNOWN	291	ARM/2	4.30000	2							
UNKNOWN	292	ARM/2	2.20000	2							
UNKNOWN	293	ARM/2	5.00000	2							
UNKNOWN	291	ARM/2			4.10000	2					
OCTA-1,2,5-TRICYCLO	291	ARM/2			0.30000	2					
2-METHYL-1-PROPANOLIC ACID	294	ARM/2			0.30000	2					
UNKNOWN	299	ARM/2			0.30000	2					
UNKNOWN	299	ARM/2			2.00000	2					
UNKNOWN	294	ARM/2			1.00000	2					
BENZOCYCLOPROPANTHENE	295	ARM/2			0.41000	2					
UNKNOWN	294	ARM/2			0.00000	2					
UNKNOWN	295	ARM/2			0.40000	2					
UNKNOWN	295	ARM/2					0.73000	2			
4-METHYL-DODECANE	297	ARM/2					0.93000	2			
4,8-DIMETHYL-1-ANOL	297	ARM/2					0.43000	2			
UNKNOWN	297	ARM/2					0.42000	2			
UNKNOWN	297	ARM/2					1.70000	2			
UNKNOWN	297	ARM/2					0.32000	2			
UNKNOWN	297	ARM/2					2.20000	2			
UNKNOWN	297	ARM/2					0.95000	2			
2,2,10-TRIMETHYL-1-DECANE	297	ARM/2					1.50000	2			
2,6,11-TRIMETHYL-1-DECANE	297	ARM/2					2.40000	2			
UNKNOWN	297	ARM/2					0.36000	2			
UNKNOWN	297	ARM/2					2.00000	2			
UNKNOWN	297	ARM/2					2.70000	2			
HEXACANE	297	ARM/2					1.20000	2			
UNKNOWN	297	ARM/2					0.39000	2			
UNKNOWN	297	ARM/2					4.70000	2			
UNKNOWN	297	ARM/2					0.72000	2			
UNKNOWN	297	ARM/2					1.20000	2			
UNKNOWN	297	ARM/2					2.70000	2			
UNKNOWN	297	ARM/2					4.20000	2			
2,3,7-TRIMETHYL-DEKANE	297	ARM/2						0.30000	2		
UNKNOWN	297	ARM/2						0.30000	2		
2,7,10-TRIMETHYL-DODEKANE	297	ARM/2						0.41000	2		

VOLATILE ARM - ARID BASE NO. 1001 PESTICIDES AND INDOANES 1 - TARGET COMPOUND LIST COMPOUND (FILL)  
 2 - TENTATIVELY IDENTIFIED COMPOUND 3 - 50% LABORATORY ANALYSIS 4 - OTHER ANALYSIS  
 5 - ESTIMATED CONCENTRATION (IF, IT IS LESS THAN 0.01, OR 0.1, WITH DATA OUT OF CONTROL LIMITS) 6 - NO CONFIRMATION  
 7 - DATA FOR ANALYSIS IS MISSING 8 - POSSIBLE LABORATORY CONTAMINATION 9 - UNDETECTED 10 - PESTICIDE IS QUESTIONABLE



DATE: 05/11/01  
PAGE: 000001

Page 1 of 1  
OPERATIONS IN FATS FOR THE  
Sample ID: 000001

REPORT: REPORT NUMBER AND STATION LOCATION

Sample Number	MF276 - FP640	MF277 - FP641	MF278 - FP642	MF279 - FP650	MF280 - FQ103	MF281 - FQ110	MF282 - FQ111	MF283 - FQ112	MF284 - FQ113	MF289 - FQ114
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Percent Moisture	1.1 - 9	10.5 - 11	11.5 - 14	13.0 - 13	11.5 - 10	13.3 - 13	10.9 - 12	12.1 - 9	18.7 - 29	3.0 - 3.0
Location	NORTH END OF ROAD	WEST OF TOOLING AREA	LOWER ROADWAY	NORTH OF SOUTH OF FOUR	SOUTHERN END OF WEST ROAD	SOUTH END OF ROAD SURFACE	SUBSURFACE NORTH OF	NORTH END OF WEST DRAINAGE	WEST DRAINAGE	SURFACE SOIL
Sample Description	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5	STATION 6	STATION 7	STATION 8	STATION 9	STATION 10

Compound Name	AS/SCAN	CLASS
UNKNOWN	1359	ARM/2
UNKNOWN	1361	ARM/2
UNKNOWN	1601	ARM/2
UNKNOWN	1611	ARM/2
UNKNOWN	1714	ARM/2
UNKNOWN	1811	ARM/2
UNKNOWN	1812	ARM/2
UNKNOWN	1813	ARM/2
UNKNOWN	1814	ARM/2
UNKNOWN	1815	ARM/2
UNKNOWN	1816	ARM/2
UNKNOWN	1817	ARM/2
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UNKNOWN	1819	ARM/2
UNKNOWN	1820	ARM/2
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UNKNOWN	1822	ARM/2
UNKNOWN	1823	ARM/2
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UNKNOWN	1826	ARM/2
UNKNOWN	1827	ARM/2
UNKNOWN	1828	ARM/2
UNKNOWN	1829	ARM/2
UNKNOWN	1830	ARM/2
UNKNOWN	1831	ARM/2
UNKNOWN	1832	ARM/2
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UNKNOWN	1911	ARM/2
UNKNOWN	1912	ARM/2
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UNKNOWN	1914	ARM/2
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UNKNOWN	1918	ARM/2
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UNKNOWN	1991	ARM/2
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UNKNOWN	1995	ARM/2
UNKNOWN	1996	ARM/2
UNKNOWN	1997	ARM/2
UNKNOWN	1998	ARM/2
UNKNOWN	1999	ARM/2
UNKNOWN	2000	ARM/2

Y04 - VOLATILE ARM - ACID-BASE NEUTRAL PER - PESTICIDE FOR IND - INORGANIC 1 - TARGET COMPOUND LIST COMPOUND (TEL)  
 2 - TENTATIVELY IDENTIFIED COMPOUND (TEL) H - POLYCYCLIC AROMATIC ANALYTE X - OTHER ANALYTE  
 3 - ESTIMATED CONCENTRATION (TEL) TEL LESS THAN ENGL OR TEL WITH DATA OUT OF CONTROL LIMITS) C - MS CONFIRMATION  
 F - DATA FOR ANALYTE IS UNUSABLE R - POSSIBLE AROMATIC CONTAMINANT U - UNDETECTED P - PESTICIDE IN QUESTIONABLE

TABLE: CROSS NUMBER AND STATION LOCATION

[illegible][illegible][illegible]

STATION LOCATION

STATION	1	2	3	4	5	6	7	8	9	10
LOCATION	WEST OF ROADWAY	SOUTH OF ROADWAY	NORTH OF ROADWAY	SOUTHERN END OF WEST ROAD	SOUTH END OF ROAD SURFACE	SURFACE	NORTH END OF ROAD SURFACE	WEST DRAINAGE DITCH	SURFACE SOIL	BACKGROUND
STATION	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5	STATION 6	STATION 7	STATION 8	STATION 9	STATION 10

LABORATORY NAME: CAN. 1001

VDA - VOLATILE; ARN - AROCLOR; HCB - HEXACHLOROBENZENE; PCB - POLYCHLORINATED BIPHENYL; INO - INORGANIC; 1 - TARGET COMPOUND LIST COMPOUND (TCL)  
 2 - TENTATIVELY IDENTIFIED COMPOUND (TIC) - F - FURTHER LABORATORY ANALYSIS; Y - OTHER ANALYTE  
 1 - ESTIMATED CONCENTRATION (PPM); 100, 1000, 10,000, 100,000 WITH TOL (OUT OF CONTROL LIMITS); C - NO CONFIRMATION  
 0 - DATA FOR ANALYTE IS UNRELIABLE; 1 - POSITIVE; APPROXIMATELY CONTAINING; 0 - UNDETECTED; 1 - RESIDUE IS QUESTIONABLE

Chemical Data Summary

DATE NAME AND OTHER INFORMATION APPROPRIATE HERE, 100

CONCENTRATIONS IN PARTS PER MILLION (PPM)  
Sampling Date: 10/10/83

## STATION NUMBER AND STATION LOCATION

Compound Name	Station 11	Station 12	Station 13	Station 14	Station 15	Station 16	Station 17	Station 18	Station 19
ALUMINUM	4400	13900	12500	5630	9290	7270	12400	9260	7540
ARSENIC	2.50	3.20	3.40	6.10	3.40	1.40	7.10	2.40	2.00
BARIUM	51.60	172	89.80	81.30	31.90	39.30	98.20	25	76.20
BERYLLIUM		1.10	0.32				0.47		0.47
CADMIUM							1.40		
CALCIUM	1520	6190	8320	11100	9600	3270	24200	9000	3940
CHLORINE	6	17.70	72	7.80	21.50	14.50	41.40	17.40	7.70
COPPER	3.40	10.50	7.30	6.70	9.70	4.40	31.20	120	13
IRON	5700	14100	10300	7420	3330	3400	11600	3400	5290
LEAD	4.90	48.20	20.20	20.20	22	17.30	170	352	11.20
MAGNESIUM	709	3150	2720	1210	992	1110	4460	4270	1320
MANGANESE	111	201	144	220	109	94.30	292	130	34.70
NICKEL	7.70	14.60	7.80			6.40	10.50		10.70
POTASSIUM	14	1750	1510	700	392	891	1400		597
SILVER									
SODIUM		127	78.70						66.80
VANADIUM	11	31.70	21.40	17	11.40		4.20		9.50
ZINC	12.70	74	249	43.00	112		770	815	33.60
CYANIDE			1.80						
ACETONE		0.01700			0.01700				0.04300
BENZOL								0.00000	
BENZYL ALCOHOL								0.00000	
2-METHYLBENZOL								0.00000	
4-METHYLBENZOL								1.00000	
2,4-DIMETHYLBENZOL								1.00000	
NAPHTHALENE		0.13000	1.30000		0.13000	0.17000	0.43000	33.00000	
2-METHYLNAPHTHALENE		0.16000	1.40000		0.09100	0.14000	0.56000	29.00000	
1-METHYLNAPHTHALENE									
ACENAPHTHYLENE									
ACENAPHTHENE			2.70000	0.11000	0.17000	0.26000	1.10000	40.00000	
BIBENZOFURAN		0.22000	1.70000		0.12000	0.18000	0.72000	33.00000	
FLUORENE		0.33000	2.60000	0.07800	0.17000	0.25000	1.00000	37.00000	
PHENANTHRENE		2.70000	20.00000	0.40000	1.40000	1.70000	8.50000	400.00000	0.20000
ANTHRACENE		0.53000	3.80000	0.12000	0.23000	0.34000	2.00000	37.00000	
DI-N-BUTYLPHTHALATE							0.13000		
FLUORANTHENE		1.00000	50.00000	0.67000	1.60000	1.60000	0.00000	340.00000	0.18000
PYRENE		0.60000	15.00000	0.53000	1.50000	1.30000	15.00000	320.00000	0.20000
BUFFY BENZYLPHTHALATE			0.12000						
BENZODIANTHRENE		0.22000	6.60000	0.22000	0.36000	0.51000	8.60000	110.00000	

DATA AVAILABLE FOR ALL COMPOUNDS LISTED IN THIS TABLE. (1) - TARGET COMPOUND LIST (COMPOUND LIST)

(2) - TENTATIVE IDENTIFICATION OF COMPOUNDS. (3) - OTHER COMPOUNDS AND/OR OTHER ANALYTES

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Compound Name	Conc	Unit	Value	Unit	Value	Unit
BENZOCYCLOHEXADIENE	0.0001	g/g	0.86000	J		
BIPHENYL	0.0001	g/g	0.83000	J		
2-METHYLANTHRACENE	0.0001	g/g	1.10000	J		
4-METHYLANTHRACENE	0.0001	g/g	1.38000	J		
2-METHYLBIPHENYL	0.0001	g/g	0.38000	J		
UNKNOWN	0.0001	g/g	2.78000	J		
2-PHENYLBIPHENYL	0.0001	g/g	0.65000	J		
9,10-ANTHRACENEDIOL	0.0001	g/g	0.74000	J		
UNKNOWN	0.0001	g/g	0.62000	J		
BENZOCYCLOHEXADIENE	0.0001	g/g	2.18000	J		
UNKNOWN	0.0001	g/g	4.28000	J		
UNKNOWN	0.0001	g/g	4.58000	J		
UNKNOWN	0.0001	g/g	5.68000	J		
UNKNOWN	0.0001	g/g	2.40000	J		
BENZOCYCLOHEXADIENE	0.0001	g/g	2.30000	J		
UNKNOWN	0.0001	g/g	16.0000	BZ		
UNKNOWN	0.0001	g/g	1.38000	BZ		
UNKNOWN	0.0001	g/g	1.28000	BZ		
UNKNOWN	0.0001	g/g	1.18000	J		
UNKNOWN	0.0001	g/g	0.78000	J		
UNKNOWN	0.0001	g/g	1.18000	J		
UNKNOWN	0.0001	g/g	0.29000	J		
UNKNOWN	0.0001	g/g	3.00000	J		
BENZOCYCLOHEXADIENE	0.0001	g/g	0.36000	J		
UNKNOWN	0.0001	g/g	0.54000	J		
UNKNOWN	0.0001	g/g	0.76000	J		
UNKNOWN	0.0001	g/g	1.30000	J		
UNKNOWN	0.0001	g/g	1.10000	J		
BANAL (BIS(2,4,6-TRIMETHYL-3-HYDROXYBENZYL)AMINE)	0.0001	g/g	1.08000	J		
UNKNOWN	0.0001	g/g	0.65000	J		
UNKNOWN	0.0001	g/g	9.30000	BZ		
UNKNOWN	0.0001	g/g	3.30000	J		
UNKNOWN	0.0001	g/g	2.40000	BZ		
UNKNOWN	0.0001	g/g	0.72000	BZ		
UNKNOWN	0.0001	g/g	0.56000	J		
UNKNOWN	0.0001	g/g	0.79000	J		
UNKNOWN	0.0001	g/g	25.0000	BZ		
UNKNOWN	0.0001	g/g	4.20000	BZ		
UNKNOWN	0.0001	g/g	1.80000	BZ		
UNKNOWN	0.0001	g/g	2.30000	J		

[illegible]



**Abstract**

VBA VOLATILE APH ACID BALT SE-104 789 22-NOV-68 100 100 - INORGANIC 1 TARGET COMPOUND LIST COMPOUND (TEL)

7 TENTATIVELY IDENTIFIED PARTIALS OF THE POSITION APPROPRIATE ANALYSIS OF THE ANALYSIS

' FOREIGN DISSEMINTION OF INFORMATION TO THE UNITED STATES IS NOT CONFIDENTIAL.

1. "DATA FOR AND USE IN THE CASE OF" 2. "GENERAL" 3. "THE" 4. "PROSECUTION" 5. "INVESTIGATION" 6. "FEDERAL" 7. "BUREAU OF INVESTIGATION"

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2 TENTATIVELY IDENTIFIED FROM ANALYSIS OF US FOOD LABORATORY ANALYSIS OF OTHER ANALYTIC  
3 ESTIMATED CONCENTRATION RANGE OF 100-1000 PPM. US FOOD LABORATORY OF CONTROL LIMITS OF 100 PPM CONTAMINATION  
4 DATA FOR ANALYSIS OF 100-1000 PPM. ESTIMATED CONCENTRATION RANGE OF 100-1000 PPM. UNDETECTED P PESTICIDE IS QUESTIONABLE



TABLE 4: TARGET COMPOUND MONITORING STATION LOCATION

Compound Name	MF001	MF002	MF003	MF004	MF005	MF006	MF007	MF008	MF009	MF010	MF011	MF012	MF013	MF014	MF015	MF016	MF017	MF018	MF019	MF020	MF021	MF022	MF023	MF024	MF025	MF026	MF027	MF028	MF029	MF030	MF031	MF032	MF033	MF034	MF035	MF036	MF037	MF038	MF039	MF040	MF041	MF042	MF043	MF044	MF045	MF046	MF047	MF048	MF049	MF050	MF051	MF052	MF053	MF054	MF055	MF056	MF057	MF058	MF059	MF060	MF061	MF062	MF063	MF064	MF065	MF066	MF067	MF068	MF069	MF070	MF071	MF072	MF073	MF074	MF075	MF076	MF077	MF078	MF079	MF080	MF081	MF082	MF083	MF084	MF085	MF086	MF087	MF088	MF089	MF090	MF091	MF092	MF093	MF094	MF095	MF096	MF097	MF098	MF099	MF100	MF101	MF102	MF103	MF104	MF105	MF106	MF107	MF108	MF109	MF110	MF111	MF112	MF113	MF114	MF115	MF116	MF117	MF118	MF119	MF120	MF121	MF122	MF123	MF124	MF125	MF126	MF127	MF128	MF129	MF130	MF131	MF132	MF133	MF134	MF135	MF136	MF137	MF138	MF139	MF140	MF141	MF142	MF143	MF144	MF145	MF146	MF147	MF148	MF149	MF150	MF151	MF152	MF153	MF154	MF155	MF156	MF157	MF158	MF159	MF160	MF161	MF162	MF163	MF164	MF165	MF166	MF167	MF168	MF169	MF170	MF171	MF172	MF173	MF174	MF175	MF176	MF177	MF178	MF179	MF180	MF181	MF182	MF183	MF184	MF185	MF186	MF187	MF188	MF189	MF190	MF191	MF192	MF193	MF194	MF195	MF196	MF197	MF198	MF199	MF200	MF201	MF202	MF203	MF204	MF205	MF206	MF207	MF208	MF209	MF210	MF211	MF212	MF213	MF214	MF215	MF216	MF217	MF218	MF219	MF220	MF221	MF222	MF223	MF224	MF225	MF226	MF227	MF228	MF229	MF230	MF231	MF232	MF233	MF234	MF235	MF236	MF237	MF238	MF239	MF240	MF241	MF242	MF243	MF244	MF245	MF246	MF247	MF248	MF249	MF250	MF251	MF252	MF253	MF254	MF255	MF256	MF257	MF258	MF259	MF260	MF261	MF262	MF263	MF264	MF265	MF266	MF267	MF268	MF269	MF270	MF271	MF272	MF273	MF274	MF275	MF276	MF277	MF278	MF279	MF280	MF281	MF282	MF283	MF284	MF285	MF286	MF287	MF288	MF289	MF290	MF291	MF292	MF293	MF294	MF295	MF296	MF297	MF298	MF299	MF300	MF301	MF302	MF303	MF304	MF305	MF306	MF307	MF308	MF309	MF310	MF311	MF312	MF313	MF314	MF315	MF316	MF317	MF318	MF319	MF320	MF321	MF322	MF323	MF324	MF325	MF326	MF327	MF328	MF329	MF330	MF331	MF332	MF333	MF334	MF335	MF336	MF337	MF338	MF339	MF340	MF341	MF342	MF343	MF344	MF345	MF346	MF347	MF348	MF349	MF350	MF351	MF352	MF353	MF354	MF355	MF356	MF357	MF358	MF359	MF360	MF361	MF362	MF363	MF364	MF365	MF366	MF367	MF368	MF369	MF370	MF371	MF372	MF373	MF374	MF375	MF376	MF377	MF378	MF379	MF380	MF381	MF382	MF383	MF384	MF385	MF386	MF387	MF388	MF389	MF390	MF391	MF392	MF393	MF394	MF395	MF396	MF397	MF398	MF399	MF400	MF401	MF402	MF403	MF404	MF405	MF406	MF407	MF408	MF409	MF410	MF411	MF412	MF413	MF414	MF415	MF416	MF417	MF418	MF419	MF420	MF421	MF422	MF423	MF424	MF425	MF426	MF427	MF428	MF429	MF430	MF431	MF432	MF433	MF434	MF435	MF436	MF437	MF438	MF439	MF440	MF441	MF442	MF443	MF444	MF445	MF446	MF447	MF448	MF449	MF450	MF451	MF452	MF453	MF454	MF455	MF456	MF457	MF458	MF459	MF460	MF461	MF462	MF463	MF464	MF465	MF466	MF467	MF468	MF469	MF470	MF471	MF472	MF473	MF474	MF475	MF476	MF477	MF478	MF479	MF480	MF481	MF482	MF483	MF484	MF485	MF486	MF487	MF488	MF489	MF490	MF491	MF492	MF493	MF494	MF495	MF496	MF497	MF498	MF499	MF500	MF501	MF502	MF503	MF504	MF505	MF506	MF507	MF508	MF509	MF510	MF511	MF512	MF513	MF514	MF515	MF516	MF517	MF518	MF519	MF520	MF521	MF522	MF523	MF524	MF525	MF526	MF527	MF528	MF529	MF530	MF531	MF532	MF533	MF534	MF535	MF536	MF537	MF538	MF539	MF540	MF541	MF542	MF543	MF544	MF545	MF546	MF547	MF548	MF549	MF550	MF551	MF552	MF553	MF554	MF555	MF556	MF557	MF558	MF559	MF560	MF561	MF562	MF563	MF564	MF565	MF566	MF567	MF568	MF569	MF570	MF571	MF572	MF573	MF574	MF575	MF576	MF577	MF578	MF579	MF580	MF581	MF582	MF583	MF584	MF585	MF586	MF587	MF588	MF589	MF590	MF591	MF592	MF593	MF594	MF595	MF596	MF597	MF598	MF599	MF600	MF601	MF602	MF603	MF604	MF605	MF606	MF607	MF608	MF609	MF610	MF611	MF612	MF613	MF614	MF615	MF616	MF617	MF618	MF619	MF620	MF621	MF622	MF623	MF624	MF625	MF626	MF627	MF628	MF629	MF630	MF631	MF632	MF633	MF634	MF635	MF636	MF637	MF638	MF639	MF640	MF641	MF642	MF643	MF644	MF645	MF646	MF647	MF648	MF649	MF650	MF651	MF652	MF653	MF654	MF655	MF656	MF657	MF658	MF659	MF660	MF661	MF662	MF663	MF664	MF665	MF666	MF667	MF668	MF669	MF670	MF671	MF672	MF673	MF674	MF675	MF676	MF677	MF678	MF679	MF680	MF681	MF682	MF683	MF684	MF685	MF686	MF687	MF688	MF689	MF690	MF691	MF692	MF693	MF694	MF695	MF696	MF697	MF698	MF699	MF700	MF701	MF702	MF703	MF704	MF705	MF706	MF707	MF708	MF709	MF710	MF711	MF712	MF713	MF714	MF715	MF716	MF717	MF718	MF719	MF720	MF721	MF722	MF723	MF724	MF725	MF726	MF727	MF728	MF729	MF730	MF731	MF732	MF733	MF734	MF735	MF736	MF737	MF738	MF739	MF740	MF741	MF742	MF743	MF744	MF745	MF746	MF747	MF748	MF749	MF750	MF751	MF752	MF753	MF754	MF755	MF756	MF757	MF758	MF759	MF760	MF761	MF762	MF763	MF764	MF765	MF766	MF767	MF768	MF769	MF770	MF771	MF772	MF773	MF774	MF775	MF776	MF777	MF778	MF779	MF780	MF781	MF782	MF783	MF784	MF785	MF786	MF787	MF788	MF789	MF790	MF791	MF792	MF793	MF794	MF795	MF796	MF797	MF798	MF799	MF800	MF801	MF802	MF803	MF804	MF805	MF806	MF807	MF808	MF809	MF810	MF811	MF812	MF813	MF814	MF815	MF816	MF817	MF818	MF819	MF820	MF821	MF822	MF823	MF824	MF825	MF826	MF827	MF828	MF829	MF830	MF831	MF832	MF833	MF834	MF835	MF836	MF837	MF838	MF839	MF840	MF841	MF842	MF843	MF844	MF845	MF846	MF847	MF848	MF849	MF850	MF851	MF852	MF853	MF854	MF855	MF856	MF857	MF858	MF859	MF860	MF861	MF862	MF863	MF864	MF865	MF866	MF867	MF868	MF869	MF870	MF871	MF872	MF873	MF874	MF875	MF876	MF877	MF878	MF879	MF880	MF881	MF882	MF883	MF884	MF885	MF886	MF887	MF888	MF889	MF890	MF891	MF892	MF893	MF894	MF895	MF896	MF897	MF898	MF899	MF900	MF901	MF902	MF903	MF904	MF905	MF906	MF907	MF908	MF909	MF910	MF911	MF912	MF913	MF914	MF915	MF916	MF917	MF918	MF919	MF920	MF921	MF922	MF923	MF924	MF925	MF926	MF927	MF928	MF929	MF930	MF931	MF932	MF933	MF934	MF935	MF936	MF937	MF938	MF939	MF940	MF941	MF942	MF943	MF944	MF945	MF946	MF947	MF948	MF949	MF950	MF951	MF952	MF953	MF954	MF955	MF956	MF957	MF958	MF959	MF960	MF961	MF962	MF963	MF964	MF965	MF966	MF967	MF968	MF969	MF970	MF971	MF972	MF973	MF974	MF975	MF976	MF977	MF978	MF979	MF980	MF981	MF982	MF983	MF984	MF985	MF986	MF987	MF988	MF989	MF990	MF991	MF992	MF993	MF994	MF995	MF996	MF997	MF998	MF999	MF1000	MF1001	MF1002	MF1003	MF1004	MF1005	MF1006	MF1007	MF1008	MF1009	MF1010	MF1011	MF1012	MF1013	MF1014	MF1015	MF1016	MF1017	MF1018	MF1019	MF1020	MF1021	MF1022	MF1023	MF1024	MF1025	MF1026	MF1027	MF1028	MF1029	MF1030	MF1031	MF1032	MF1033	MF1034	MF1035	MF1036	MF1037	MF1038	MF1039	MF1040	MF1041	MF1042	MF1043	MF1044	MF1045	MF1046	MF1047	MF1048	MF1049	MF1050	MF1051	MF1052	MF1053	MF1054	MF1055	MF1056	MF1057	MF1058	MF1059	MF1060	MF1061	MF1062	MF1063	MF1064	MF1065	MF1066	MF1067	MF1068	MF1069	MF1070	MF1071	MF1072	MF1073	MF1074	MF1075	MF1076	MF1077	MF1078	MF1079	MF1080	MF1081	MF1082	MF1083	MF1084	MF1085	MF1086	MF1087	MF1088	MF1089	MF1090	MF1091	MF1092	MF1093	MF1094	MF1095	MF1096	MF1097	MF1098	MF1099	MF1100	MF1101	MF1102	MF1103	MF1104	MF1105	MF1106	MF1107	MF1108	MF1109	MF1110	MF1111	MF1112	MF1113	MF1114	MF1115	MF1116	MF1117	MF1118	MF1119	MF1120	MF1121	MF1122	MF1123	MF1124	MF1125	MF1126	MF1127	MF1128	MF1129	MF1130	MF1131	MF1132	MF1133	MF1134	MF1135	MF1136	MF1137	MF1138	MF1139	MF1140	MF1141	MF1142	MF1143	MF1144	MF1145	MF1146	MF1147	MF1148	MF1149	MF1150	MF1151	MF1152	MF1153	MF1154	MF1155	MF1156	MF1157	MF1158	MF1159	MF1160	MF1161	MF1162	MF1163	MF1164	MF1165	MF1166	MF1167	MF1168	MF1169	MF1170	MF1171	MF1172	MF1173	MF1174	MF1175	MF1176	MF1177	MF1178	MF1179	MF1180	MF1181	MF1182	MF1183	MF1184	MF1185	MF1186	MF1187	MF1188	MF1189	MF1190	MF1191	MF1192	MF1193	MF1194	MF1195	MF1196	MF1197	MF1198	MF1199	MF1200	MF1201	MF1202	MF1203	MF1204	MF1205	MF1206	MF1207	MF1208	MF1209	MF1210	MF1211	MF1212	MF1213	MF1214	MF1215	MF1216	MF1217	MF1218	MF1219	MF1220	MF1221	MF1222	MF1223	MF1224	MF1225	MF1226	MF1227	MF1228	MF1229	MF1230	MF1231	MF1232	MF1233	MF1234	MF1235	MF1236	MF1237	MF1238	MF1239	MF1240	MF1241	MF1242	MF1243	MF1244	MF1245	MF1246	MF1247	MF1248	MF1249	MF1250	MF1251	MF1252	MF1253	MF1254	MF1255	MF1256	MF1257	MF1258	MF1259	MF1260	MF1261	MF1262	MF1263	MF1264	MF1265	MF1266	MF1267	MF1268	MF1269	MF1270	MF1271	MF1272	MF1273	MF1274	MF1275	MF1276	MF1277	MF1278	MF1279	MF1280	MF1281	MF1282	MF1283	MF1284	MF1285	MF1286	MF1287	MF1288	MF1289	MF1290	MF1291	MF1292	MF1293	MF1294	MF1295	MF1296	MF1297	MF1298	MF1299	MF1300	MF1301	MF1302	MF1303	MF1304	MF1305	MF1306	MF1307	MF1308	MF1309	MF1310	MF1311	MF1312
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Compound Name

[illegible]

FACSIMILE TRANSMISSION

WEYERHAEUSER ANALYTICAL & TESTING SERVICES  
Analytical Chemistry Laboratories  
WTC 2F25  
Tacoma WA 98477

*JS*  
*5-27-91*

FAX No. (206) 924-6654  
Verify No. (206) 924-6872

---

TO: *Terry Fan*

CITY: *EPA Region IV*

FAX No. *8-713-983-2248*

Verify No:

FROM: *Dennis Catalano*

PHONE: *924-6242*

TOTAL NO. OF PAGES (including this page): *31*

Write message here or attach additional pages:

*Pages requested for Case #16177 SDG # FP640.*

In Reference to Case No(s): 16177     SDG: FP640
---

**Contract Laboratory Program  
REGIONAL/LABORATORY COMMUNICATION SYSTEM**

**Telephone Record Log**

Date of Call: May 27 & May 31, 1991  
Laboratory Name: WEYER  
Lab Contact: Dennis Catalano

Region: 6  
Regional Contact: Terry Fan - ESAT

Call initiated by:        Laboratory        X Region

**In reference to data for the following sample fraction(s):**

VOA    BNA    PEST/PCB

**Summary of Questions/Issues Discussed:**

**A. VOA**

1. Raw data for all daily calibrations were illegible (P. 204-208, 210-214 and 216-220). Please FAX to the Region.

**B. BNA**

1. The first page of Form VI for instrument FINN was omitted (P. 1507A).
2. The reported acid surrogate recoveries appeared to be calculated based on a spiking concentration of 150 ug/sample, which was not the contract specified spiking level.

**C. Pesticide/PCB**

1. Raw data for samples FP-650 MS/MSD and PBLK1 were illegible (P. 1933-1936, P. 1938-1942 and P. 1945-1949).
2. Were samples screened to characterize analysis level?
3. Please rescale chromatograms for samples FQ-113 and FQ-122 to the same scale as for the initial Individual A and Individual B analyses.

In Reference to Case No(s):  
16177 SDG: FP640

**Contract Laboratory Program  
REGIONAL/LABORATORY COMMUNICATION SYSTEM**

**Telephone Record Log**

Date of Call: May 27, 1991  
Laboratory Name: WEYER  
Lab Contact: Dennis Catalano  
  
Region: 6  
Regional Contact: Terry Fan - ESAT  
  
Call initiated by:      Laboratory      X      Region

**Summary of Resolution:**

1. The laboratory will FAX the illegible data to the Region right away.
2. All BNA samples should have been spiked with contract specified surrogate amounts (200 ug/sample for acid surrogates).
3. Pesticide/PCB soil samples were not screened for analysis level, but the laboratory will submit requested rescaled sample chromatograms.

  
Signature

May 31, 1991  
Date

**Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy**



## FACSIMILE TRANSMISSION

WEYERHAEUSER ANALYTICAL &amp; TESTING SERVICES

Analytical Chemistry Laboratories

WTC 2F25

Tacoma, WA 98477

FAX No. (206) 924-6654

Verify No. (206) 924-6872

JF  
5-31-91

To: Terry Fan

City: EPA

FAX No.: (713) 903 2248

Verify No.:

From: D. CATALANO

(206)  
Phone: 924 6242

TOTAL NUMBER OF PAGES (including this page):

5 3 5

Write message here or attach additional pages:

As I agree with your decision regarding the usability of the data, Section 6.2.3.4 page D-41 indicates that a 100 fold range is acceptable. These questions are addressed in the new contract, but we are following the 88 contract. Please inform me as to what to do to proceed.

Thanks

Dennis M. Catalano

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TX 77099

MEMORANDUM

Date: May 31, 1991  
Subject: CLP Data Review *[Signature]*  
From: Mahmoud El-Feky, Acting TPO, Region 6  
To: Michael Daggett, Chief, Organic Section, Houston  
Branch, Region 6

Attached is the data review summary for Case # 16177  
SDG # FP640  
Site Gulfstream  
Aerospace Corp.

Data was found: (X) Provisional  
( ) Unacceptable

Action required by TPO: (X) Yes  
( ) No

COMMENTS:

1. The data package arrived 5 days late.
2. GPC deliverables were omitted.
3. Carry-over interferences obscured the detection of TCL compounds in Pesticide/PCB sample FQ-114. Reanalysis at appropriate level was requested.
4. Major matrix interferences obscured detection of TCL compounds in Pesticide/PCB samples FQ-113 and FQ-122. Reanalyses at medium level were requested.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TEXAS 77099  
INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 16177 SITE Gulf Stream Aerospace  
LABORATORY Keystone (TX) NO. OF SAMPLES  
CONTRACT # 68-D0-0147 MATRIX 19/soil & sediment  
SDG # MFN276 REVIEWER (IF NOT ESD) ESAT  
SOW# 7/88 REVIEWER'S NAME Victor Chapman  
TPO: ACTION \_\_\_\_\_ FYI X COMPLETION DATE May 23, 1991  
ACCT # 1TGBDNC8 SF # TGBUZZ

SAMPLE NO.: MFN276, MFN277, MFN278, MFN279, MFN280, MFN281,  
MFN282, MFN283, MFN284, MFN809, MFN812, MFN813, MFN814, MFN815,  
MFN816, MFN817, MFN818, MFN819, MFN820

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>
2. CALIBRATIONS	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>
3. BLANKS	<u>X</u>	<u>X</u>	<u>O</u>	<u>O</u>
4. ICS	<u>O</u>			
5. LCS	<u>O</u>	<u>O</u>		
6. DUPLICATE ANALYSIS	<u>X</u>	<u>O</u>	<u>O</u>	<u>O</u>
7. MATRIX SPIKE	<u>X</u>	<u>M</u>	<u>O</u>	<u>O</u>
8. MSA		<u>X</u>		
9. SERIAL DILUTION	<u>O</u>			
10. SAMPLE VERIFICATION	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>
11. OTHER QC	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
12. OVERALL ASSESSMENT	<u>X</u>	<u>M</u>	<u>O</u>	<u>O</u>

O = Data had no problems/or qualified due to minor problems.

M = Data qualified due to major problems.

Z = Data unacceptable.

X = Problems, but do not affect data.

N/A= Not applicable

ACTION ITEMS: Matrix spike recoveries were outside of limits; differences between duplicate results exceeded quality control limits; furnace atomic absorption analytical spike recoveries exceeded limits for 23 of 76 determinations; furnace atomic absorption duplicate injection readings had relative standard deviations above 20% two times; method of standard addition correlation coefficients below 0.995, and blank concentrations were above the instrument detection limits.

AREAS OF CONCERN:

NOTABLE PERFORMANCE: Mercury and cyanide results were acceptable.



INORGANIC QA REVIEW  
CONTINUATION PAGE

Case 16177 SDG MFN276 Site Gulf Stream Aero Lab Keystone (TX)

COMMENTS:

Nineteen soil/sediment samples were analyzed at low concentrations for total metals and cyanide. The data package is provisional because: matrix spike recoveries were outside of limits; differences between duplicate results exceeded quality control limits; furnace atomic absorption analytical spike recoveries exceeded limits for 23 of 76 determinations; furnace atomic absorption duplicate injection readings had relative standard deviations above 20% two times; method of standard addition correlation coefficients below 0.995, and blank concentrations were above the instrument detection limits.

**1. Holding Times**

All holding time criteria were met.

**2. Calibrations**

All calibrations were acceptable.

**3. Blanks**

**A. Calibration Blanks**

The concentrations of copper in the calibration blanks were above the instrument detection limit (IDL) but less than the contract required detection limit (CRDL). Sample results greater than the IDL but less than five times the amount in any blank should be qualified as undetected (U).

**B. Preparation Blank**

The concentration of zinc in the preparation blank was above the instrument detection limit (IDL) but less than the contract required detection limit (CRDL). Sample results greater than the IDL but less than five times the amount in any blank should be qualified as undetected (U).

The concentration of selenium in the preparation blank was above the negative IDL. False negatives are possible.

C. All other blank results were acceptable.

**4. ICS**

Interference check sample criteria were met.

## **5. LCS**

All laboratory control sample results were acceptable.

## **6. Duplicate Analysis**

- A. The calcium, iron, and zinc results are qualified as estimated (J) due to duplicate result relative percent differences of 131.8%, 42.1%, and 102.6%, respectively.
- B. The 80.0 mg/Kg difference between duplicate copper results exceeded the technical limit of 11.4 mg/Kg (twice the CRDL). The copper results are qualified as estimated (J).
- C. All other duplicate results met technical quality control criteria.

## **7. Matrix Spike**

### **A. Pre-digestion/Pre-distillation Matrix Spike Recovery**

The antimony, manganese, and zinc sample results are qualified as estimated (J and UJ) due to pre-digestion matrix spike recoveries of 65.1%, 71.9%, and 127.0%, respectively. Matrix interference is suspected.

### **B. Furnace Atomic Absorption Quality Control**

- 1. The arsenic results for MFN282 and MFN817 are qualified as estimated (J) due to FAA analytical spike recoveries of 119% and 128%, respectively. Matrix interference is suspected.
  - 2. The arsenic result for MFN809 is qualified as estimated (J) because the percent relative standard deviation for duplicate injections was above 20% two times and the FAA analytical spike recovery was 116.5%. Matrix interference is suspected.
  - 3. The selenium results for MFN276, MFN277, MFN278, MFN280, MFN281, MFN282, MFN283, MFN284, MFN809, MFN812, MFN813, MFN814, MFN815, MFN816, MFN817, MFN818, MFN819, MFN820 (all except MFN279) are qualified as estimated (UJ) due to FAA analytical spike recoveries of 117% to 154%. Matrix interference is suspected.
  - 4. The thallium results for MFN279 and MFN813 are qualified as estimated (UJ) due to FAA analytical spike recoveries of 79.5% and 125.5%, respectively. Matrix interference is suspected.
- C. All other analytes had acceptable pre-digestion/pre-distillation matrix spike recoveries and FAA quality control.

## **8. MSA**

The arsenic result for sample MFN814 is qualified as estimated (J) due to correlations coefficients of 0.9969 and 0.9945. Matrix interference is suspected.

The other method of standard addition results were acceptable.

## **9. Serial Dilutions**

All serial dilution results met quality control criteria.

## **10. Sample Verification**

- A. All selenium results on Form 1 require a "W" flag except sample MFN297.
- B. Arsenic in samples MFN282 and MFN817 require "W" flags on Form 1.
- C. Arsenic in sample MFN809 requires a "M" flag on Form 1.
- D. Thallium in samples MFN279 and MFN813 require "W" flags on Form 1.

## **11. Other QC**

None

## **12. Overall Assessment**

The data package is provisional for the following reasons:

- A. Matrix spike recoveries were outside of limits.
- B. Differences between duplicate results exceeded quality control limits.
- C. Furnace atomic absorption analytical spike recoveries exceeded limits for 23 of 76 determinations.
- D. Furnace atomic absorption duplicate injection readings had relative standard deviations above 20% two times.
- E. Method of standard addition correlation coefficients below 0.995.
- F. Blank concentrations were above the instrument detection limits.
- G. The percent relative standard deviation for duplicate FAA injections was above 20% two times.

All other technical requirements were met.

---

**COMPLETE SAMPLE DELIVERY GROUP FILE (CSF)  
EVIDENCE AUDIT CHECKLIST**

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Region 6

Audit No. 16177 SDG MFN276

---

Lab Name: Keystone Lab

EPA Lab Code: KEYTX

Lab Location: Houston, Texas

Date CSF Received: 4/25/91 Box No. (s): 1

Routine Analytical Services (RAS) No: 16177

Special Analytical Services (SAS) No:       

Sample Delivery Group (SDG) No: MFN276

No. of Samples: 19 Contract Type: Inorganic

Date of Audit: 5/20/91 Re-submitted CSF: Y/N? N

Auditor: Victor Chapman, Jr.  
(Print Name)

Auditor: *V. Chapman*  
(Signature)

**EVIDENCE AUDIT CHECKLIST:**

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
<b>Custody Seals</b>			
1. Custody seals present?	( X )	( )*	( )
2. Custody seals intact?	( X )	( )	( )
<b>Form DC-2</b>			
3. Form DC-2 present?	( X )	( )*	( )
4. Numbering scheme on Form DC-2 accurate?	( X )	( )	( )
5. Enclosed documents listed?	( X )	( )	( )
6. Listed documents enclosed?	( X )	( )*	( )

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**COMPLETE SAMPLE DELIVERY GROUP FILE (CSF)  
EVIDENCE AUDIT CHECKLIST**

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Region 6

Audit No. 16177 SDG MFN276

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**EVIDENCE AUDIT CHECKLIST:**

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
<b>Form DC-1</b>			
7. Form DC-1 present?	( X )	( )*	( )
8. Form DC-1 complete?	( X )	( )	( )
9. Form DC-1 accurate?	( X )	( )	( )
<b>Chain-of-Custody Record(s)</b>			
10. Chain-of-custody record(s) present?	( X )	( )*	( )
11. Chain-of-custody record(s) signed?	( X )	( )*	( )
12. Chain-of-custody record(s) dated?	( X )	( )*	( )
<b>Traffic Reports</b>			
13. Traffic report(s) or packing list(s) present?	( X )	( )*	( )
14. Traffic report(s) or packing lists(s) signed?	( X )	( )	( )
15. Traffic reports(s) or packing list(s) dated?	( X )	( )	( )
<b>Airbills</b>			
16. Airbill present/airbill sticker identified?	( X )	( )*	( )
17. Airbill signed?	( X )	( )	( )
18. Airbill dated?	( X )	( )	( )

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**COMPLETE SAMPLE DELIVERY GROUP FILE (CSF)  
EVIDENCE AUDIT CHECKLIST**

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Region 6

Audit No. 16177 SDG MFN276

---

**EVIDENCE AUDIT CHECKLIST:**

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
<b>Sample Tags</b>			
19. Sample Tags present?	( X )	( )	( )
20. Should sample tags be present?	( )*	( )	( X )
<b>Document Control</b>			
21. Laboratory documents complete?	( X )	( )	( )
22. Laboratory documents legible?	( X )	( )*	( )
23A. Original documents included in CSF?	( X )	( )	( )
DC-2	( X )	( )	( )
DC-1	( X )	( )	( )
EPA Chain-of-Custody Records	( X )	( )	( )
Traffic Report/SAS Packing List	( X )	( )	( )
Shipping Documents (e.g., airbills, hand-delivery of sample receipts)	( X )	( )	( )
23B. If "NO", does the copy indicate where original documents are located?			
DC-2	( )	( )	( X )
DC-1	( )	( )	( X )
EPA Chain-of-Custody Records	( )	( )	( X )
Traffic Report/SAS Packing List	( )	( )	( X )
Shipping Documents	( )	( )	( X )

\* Requires the initiation of corrective action measures by Regional Evidence Auditors

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**COMPLETE SAMPLE DELIVERY GROUP FILE (CSF)  
EVIDENCE AUDIT CHECKLIST**

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Region 6

Audit No. 16177 SDG MFN276

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**EVIDENCE AUDIT CHECKLIST:**

**Document Control (continued)**

**24. Auditor Comments:**

QUESTION NO.	COMMENTS
_____	_____
_____	_____
_____	_____
_____	_____

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**DO NOT WRITE IN BOX BELOW**

Date Received by CEAT: \_\_\_\_/\_\_\_\_/\_\_\_\_ Date Entered: \_\_\_\_/\_\_\_\_/\_\_\_\_

Entered By: \_\_\_\_\_  
(Print Name)

\_\_\_\_\_  
(Signature)

Please copy this form, complete the Evidence Audit Checklist, and mail the original completed Evidence Audit Checklist to the:

Attn: CSF Evidence Audit Program  
Contract Evidence Audit Team (CEAT-TechLaw)  
12600 West Colfax Avenue, Suite C-310  
Lakewood, CO 80215



**ManTech Environmental Technology**  
**ESAT Region 6**

c/o US EPA 10625 Fallstone Rd, Houston, TX 77099 TEL:(713) 983-2125

**FACSIMILE COVER SHEET**

**Please deliver the following pages to:**

**Name** Mary Cruz

**Firm** Keystone Environmental

**City** Houston **State** Texas

**Telephone** (713) 266-6800 **Ext.** \_\_\_\_\_

**Fax Telephone No.** (713) 974-5491 **Ext.** \_\_\_\_\_

**Sender:**

**Name** Victor Chapman

**Date** May 24, 1991 **Time** \_\_\_\_\_

**Total Number of pages including this Cover Sheet** 2

**If you do not receive all the pages or if any pages are unclear,  
please call: (713) 983-2125**

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**Fax Model No.** Panafax UF-620 **Fax No.** (713) 983-2248

**Contract Laboratory Program  
REGIONAL/LABORATORY COMMUNICATION SYSTEM**

**Telephone/FAX Record Log**

Date of Call: May 24, 1991  
Laboratory Name: Keystone Environmental  
Lab Contact: Mary Cruz  
Region: 6  
Regional Contact: Victor Chapman (ESAT)  
Call Initiated by: Region

**In reference to data for the following sample numbers:**

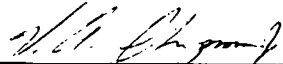
MFN276, MFN277, MFN278, MFN279, MFN280, MFN281, MFN282, MFN283,  
MFN284, MFN809, MFN812, MFN813, MFN814, MFN815, MFN816, MFN817,  
MFN818, MFN819, MFN820

**Summary of Questions/Issues Discussed:**

1. All selenium results on Form 1 require a "W" flag except sample MFN297.
2. Arsenic in samples MFN282 and MFN817 require "W" flags on Form 1.
3. Arsenic in sample MFN809 requires a "M" flag on Form 1.
4. Thallium in samples MFN279 and MFN813 require "W" flags on Form 1.

**Summary of Resolutions:**

Lab will look into items and will submit data within ten working days.

  
Signature

5/24/91  
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TEXAS 77099

ORGANIC REGIONAL DATA ASSESSMENT

CASE NO.	16177	SITE	Gulfstream Aerospace Corp.
LABORATORY	WEYER	NO. OF SAMPLES	19
CONTRACT#	68-D9-0026	MATRIX	Soil
SDG#	FP640	REVIEWER (IF NOT ESD)	ESAT
SOW#	RAS IFB 4/89	REVIEWER'S NAME	Tseng-Ying Fan
TPO: ACTION	* FYI	COMPLETION DATE	May 31, 1991
		ACCT#	1TGBDNC8
		SF#	TGBUZZ

SAMPLE NO.	FP-640	FQ-103	FQ-113	FQ-117	FQ-121
	FP-641	FQ-110	FQ-114	FQ-118	FQ-122
	FP-648	FQ-111	FQ-115	FQ-119	FQ-123
	FP-650	FQ-112	FQ-116	FQ-120	

DATA ASSESSMENT SUMMARY

	VOA	BNA	PEST	OTHER
1. HOLDING TIMES	O	O	O	N/A
2. GC/MS TUNE/INSTR. PERFORM.	O	O	3Z/M <sup>(1)</sup>	N/A
3. CALIBRATIONS	M	M	O	N/A
4. BLANKS	O	O	O	N/A
5. SURROGATES	O	O	M	N/A
6. MATRIX SPIKE/DUP	O	X	O	N/A
7. OTHER QC	N/A	N/A	N/A	N/A
8. INTERNAL STANDARDS	M	O	N/A	N/A
9. COMPOUND IDENTIFICATION	M	O	O	N/A
10. SYSTEM PERFORMANCE	O	O	O	N/A
11. OVERALL ASSESSMENT	M	M	3Z/M	N/A

O = Data had no problems/or qualified due to minor problems.

M = Data qualified due to major problems.

Z = Data unacceptable.

X = Problems, but do not affect data.

NA = Not applicable.

**ACTION ITEMS:** VOA: Acetone exceeded %D calibration criteria. Some compounds were misidentified in samples FQ-110 and FQ-115. BNA: Benzo(b)fluoranthene exceeded %D calibration criteria. Reported quantitation limits were 2X too high in 17 samples. Pest: Four compounds exceeded %D calibration criteria. The lab failed to report Endrin in sample FQ-117.

(1) Detection of TCL Pest/PCBs was obscured by carry-over or major matrix interferences in samples FQ-113, FQ-114 and FQ-122.

**AREA OF CONCERN:** The data package arrived 5 days late. GPC deliverables were omitted.

**COMMENTS/CLARIFICATIONS  
REGION 6 CLP QA REVIEW**

**CASE** 16177 SDG: FP640 **SITE** Gulfstream Aqueous Corp. **LAB** WEYER

The following is a summary of sample qualifiers used by Region 6 in reporting this CLP data:

<u>No.</u>	<u>Acceptable</u>	<u>Provisional</u>	<u>Unacceptable</u>
VOA	<u>14</u>	<u>5</u>	<u></u>
BNA	<u>2</u>	<u>17</u>	<u></u>
PEST	<u>12</u>	<u>4</u>	<u>3</u>
OTHER	<u>N/A</u>	<u></u>	<u></u>

**COMMENTS:** The case consisted of 19 soil samples for complete RAS Organics. The data package arrived 5 days late for the 35 day turnaround. Low level analyses were performed. VOA sample FQ-121 was reanalyzed, but original data should be used. BNA samples FQ-113, FQ-117, FQ-121 and FQ-122 required dilutions due to high concentrations of PNA compounds. Acetone, phenols, benzyl alcohol, PNAs, Dieldrin and Aldrin were reported >CRQL in some samples. Pesticide/PCB samples FQ-113, FQ-114 and FQ-122 are unacceptable due to carry-over or major matrix interferences. Sample reanalyses were requested. Data are provisional for 5 VOA, 17 BNA and 4 Pesticide/PCB samples due to deficiencies in calibrations, compound identification and quantitation, and internal standard performance. Some resubmitted data are enclosed and should be used.

1. **Holding Times** - Acceptable. All samples were extracted and analyzed within contractual holding time limits for all fractions.

2. **Tuning/Performance** - Provisional. BFB and DFTPP analyses met GC/MS tuning criteria. VOA sample FQ-121 was reanalyzed due to low internal standard areas, and the reanalysis had similar problems. Results associated with IS3 are estimated in VOA sample FQ-121. Internal standard areas were within QC limits for other VOA and BNA samples.

The following Pesticides appeared to be considerably >CRQL on both columns, but were not reported:

gamma-BHC, Aldrin, Endrin, DDD, DDT and Endrin ketone in sample FQ-113; and  
DDT, DDD and Endrin ketone in sample FQ-122.

Results from the two column analyses differed significantly for some compounds stated above, probably due to matrix interferences. The laboratory was contacted for reporting either positive results or raised quantitation limits for these compounds.

**COMMENTS/CLARIFICATIONS  
REGION 6 CLP QA REVIEW**

**CASE** 16177 SDG: FP640 **SITE** Gulfstream Aqueous Corp. **LAB** WEYER

**COMMENTS:**

**2. Tuning/Performance** (continued)

Quantitation limits are unusable for other TCL compounds in Pesticide/PCB samples FQ-113 and FQ-122 due to major matrix interferences. Severe carry-over interferences obscured the detection of all TCL compounds in Pesticide/PCB sample FQ-114. All Pesticide/PCB quantitation limits are unusable for sample FQ-114. Data drop out occurred in one Pesticide/PCB initial calibration analysis, but sample data were not affected. Other Pesticide/PCB analyses met QC guidelines.

**3. Calibrations** - Provisional. SPCC and CCC compounds met calibration criteria for VOA and BNA fractions. DDT failed %RSD linearity check on the quantitation column. A 3 point calibration was performed for DDT and the calibration curve was used for sample quantitation. Results for the following compounds are estimated because the compounds exceeded %D calibration criteria:

acetone in VOA samples FP-641, FQ-115, FQ-119 and FP-650MSD;  
benzo(b)fluoranthene in BNA samples FQ-111, FQ-114, FQ-115, FQ-116, FQ-117, FQ-118, FQ-120, FP-640 and FP-650;  
 $\alpha$ -BHC, DDT and Endrin ketone in sample FQ-117;  
 $\alpha$ -BHC and gamma-Chlordane in sample FQ-121; and  
gamma-Chlordane in samples FP-640 and FP-641.

The following BNA compounds exceeded linear calibration range in the original analyses, but the samples were diluted and reanalyzed:

acenaphthene, fluorene, phenanthrene, anthracene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene and benzo(g,h,i)perylene in sample FQ-113;  
phenanthrene, fluoranthene and pyrene in sample FQ-117;  
fluoranthene in sample FQ-121; and  
phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene and benzo(b)fluoranthene in sample FQ-122.

Other VOA, BNA and Pesticide/PCB calibrations met QC requirements.

**ORGANIC QA CHECKLIST  
CONTINUATION PAGE**

**CASE NO.** 16177 **SDG:** FP640 **SITE** Gulfstream Aerospace Corp.

**COMMENT:**

4. **Blanks** - Acceptable. Method blanks met QC requirements for all fractions. Acetone was reported in some VOA blanks. Acetone results in the associated samples are estimated due to possible laboratory contamination. Phenanthrene, fluoranthene, pyrene and benzo(a)anthracene were reported <CRQL in the BNA method blanks. All sample results for BNA blank contaminants are estimated due to possible laboratory contamination, except for the following results:

all blank contaminant results in samples FQ-113, FQ-113DL, FQ-114, FQ-117, FQ-117DL, FQ-121, FQ-121DL, FQ-122 and FQ-122DL; and  
results for fluoranthene and benzo(a)anthracene in sample FQ-116.

5. **Surrogates** - Provisional. The laboratory miscalculated recoveries for some VOA surrogates and for all acid surrogates in all BNA samples, but the reviewer verified that surrogate recoveries were generally within QC limits in all samples for VOA and BNA fractions. Surrogates were diluted out in BNA samples FQ-113DL and FQ-122DL, but no action was taken. Surrogates were not detected in Pesticide/PCB samples FQ-113, FQ-114 and FQ-122 due to matrix interferences. Pesticide/PCB results are estimated in these 3 samples. Surrogate recoveries were within QC limits for other Pesticide/PCB samples.

6. **Matrix Spike/Matrix Spike Duplicate** - Acceptable. MS/MSD recoveries were within QC limits in VOA and Pesticide/PCB fractions. BNA compound pentachlorophenol exceeded QC criteria for %RPD, but sample data were not affected. Other BNA MS/MSD recoveries were within QC limits.

7a. **Compound Identity** - Provisional.

Acetone was reported >CRQL in some VOA samples. Results for the following VOA compounds are rejected because these compounds were not detected, but were reported:

1,2-dichloroethene in samples FP-650MS and FP-650MSD,  
2-butanone in sample FQ-115, and  
1,2-dichloroethane in sample FQ-110.

Phenols, benzyl alcohol and PNAs were reported in the samples. Samples FQ-113, FQ-117, FQ-121 and FQ-122 required dilutions due to very high concentrations of PNAs. Anthracene was not identified, but was reported for SBLKT1.

**ORGANIC QA CHECKLIST  
CONTINUATION PAGE**

**CASE NO.** 16177 **SDG:** FP640 **SITE** Gulfstream Aerospace Corp.

**COMMENT:**

**7a. Compound Identity (continued)**

Anthracene results should not be "B" flagged in samples FQ-103, FQ-119, FQ-113DL, FQ-117DL, FQ-121DL, FQ-122DL and FP-650MSD. Benzo(g,h,i)perylene result is estimated in sample FQ-117 due to inconsistent results in the original and diluted analyses. All reported quantitation limits were 2X too high in all BNA samples, except for samples FQ-113, FQ-113DL, FQ-122 and FQ-122DL. These quantitation limits are estimated, pending laboratory clarification, and should be used with caution due to possible high bias.

Dieldrin, Aldrin and Endrin ketone were reported >CRQL, while some other single component Pesticides were reported <CRQL in some Pesticide/PCB samples. Endrin was indicated >CRQL on both columns for samples FQ-113 and FQ-117, but was not reported. Endrin results are estimated in samples FQ-113 and FQ-117, pending laboratory clarification.

**7b. Data Completeness - Provisional.** The data package was complete, except for the following deficiencies: VOA: Area for IS1 was incorrect for sample FP-650 on Form VIII (P. 15). Some surrogate recoveries were incorrect on Form II (P. 5) for samples FQ-113 and FQ-116. BNA: GPC deliverables were omitted. "B" flag was omitted for some TIC results. Spectral data for 2-methylnaphthalene were omitted in sample FQ-121DL. PEST: Surrogate recoveries for the wrong MS/MSD samples were reported on Form II. Surrogate recovery was incorrect for PBLK1. The laboratory was notified of needed resubmissions (see attached Telephone and FAX Record Logs).

**8. Case Assessment -** Pesticide/PCB samples FQ-113, FQ-114 and FQ-122 are unacceptable due to carry-over or matrix interferences. Data are provisional for 5 VOA samples due to deficiencies in calibrations, compound identification and internal standard performance. Data are provisional for 17 BNA samples due to deficiencies in calibrations and compound identification and quantitation. Data are provisional for 4 Pesticide/PCB samples due to deficiencies in calibrations and compound identification. Data are acceptable for BNA samples FQ-113 and FQ-122, and 14 VOA and 12 Pesticide/PCB samples.



In Reference to Case No(s):  
16177 SDG: FP640

**REGIONAL/LABORATORY COMMUNICATION SYSTEM**  
**FAX Record Log**

Date of FAX: June 4, 1991  
Laboratory Name: WEYER  
Lab Contact: Dennis Catalano

Region: 6  
Regional Contact: Terry Fan - ESAT

FAX initiated by:        Laboratory        X        Region

**In reference to data for the following fractions:**

VOA      BNA      Pesticide/PCB

**Summary of Questions/Issues:**

**A. VOA**

1. Form II (P. 5):
  - a) Recoveries for all surrogates were incorrect for sample FQ-113.
  - b) Recoveries for S1 and S2 were incorrect for sample FQ-116.  
Please verify.
2. Form VIII (P. 15): Area for IS1 was incorrect for sample FP-650.
3. The following compounds were not identified, but were reported on Forms I:
  - 1,2-dichloroethene in samples FP-650MS and FP-650MSD,
  - 1,2-dichloroethane in sample FQ-110, and
  - 2-butanone in sample FQ-115.Please verify.

**B. BNA**

1. Please submit GPC chromatograms for all samples and blanks (SOW B-17, Sec. b.(4)(c)).
2. Please submit GPC chromatograms for all calibration and check analyses with %recoveries marked (SOW D-24/SV Sec. 2.6.2).
3. Form II (P. 263): Reported acid surrogate recoveries were 1.33X too high for all samples. Please verify.
4. The reported quantitation limits were 2X too high for all samples, except for samples FQ-113, FQ-113DL, FQ-122 and FQ-122DL. Please verify.

## FAX COMMUNICATION LOG

Continuation Page 2

Laboratory/Contact WEYER / Dennis Catalano

In Reference To Case No. 16177 SDG: FP640

### Summary of Questions/Issues:

#### B. BNA (continued)

5. SBLKT1: Anthracene was not identified, but was reported. Please revise Form I for SBLKT1 and also remove "B" flags for anthracene results on Forms I for all associated samples (FP-650MSD, FQ-103, FQ-113DL, FQ-117DL, FQ-119, FQ-121DL and FQ-122DL).
6. Sample FQ-121DL:  
Spectral data for 2-methylnaphthalene were omitted.
7. Sample FQ-117: Benzo(g,h,i)perylene was reported >CRQL in sample FQ-117DL, but was not reported in sample FQ-117. Please check for possible presence of benzo(g,h,i)perylene in sample FQ-117.
8. Why were TIC results "X" flagged?
9. "B" flag was omitted for the following TIC results:

<u>TIC #</u>	<u>Sample</u>
1, 3, 4	FP-640, FP-648, FQ-115 FQ-120,
1, 4, 5	FP-641, FQ-112, FQ-116
1, 5, 6	FP-650
1, 2, 3	FQ-111, FQ-118, FQ-123
1, 12, 16	FQ-114
1	FQ-117, FQ-122
1, 15, 20	FQ-121
16, 19	FQ-103
8, 9	FQ-110
11, 17	FQ-117DL
2	FQ-119
7, 13	FQ-121DL

#### C. Pesticide/PCB

1. Form I (P. 1932) for PBLK1: Reported quantitation limits were 2X too low. Please verify.
2. Form II (P. 1685):
  - a) Surrogate recoveries for the wrong MS/MSD samples were reported.
  - b) Surrogate recovery was incorrect for PBLK1 (off by a factor of 2).

FAX COMMUNICATION LOG

Continuation Page 3  
Laboratory/Contact WEYER / Dennis Catalano  
In Reference To Case No. 16177 SDG: FP640

Summary of Questions/Issues:

C. Pesticide/PCB (continued)

3. The following compounds were indicated considerably >CRQL on both columns:  
Endrin in sample FQ-117;  
gamma-BHC, Aldrin, Endrin, DDD, DDT and Endrin ketone in sample FQ-113; and  
DDD, DDT and Endrin ketone in sample FQ-122.  
Why weren't they reported either as positive hits or with raised quantitation limits?

Please respond to the above items. Region 6 resubmissions may be included with CCS response or sent separately within 10 days to:

US EPA Region 6 Laboratory  
10625 Fallstone Road  
Houston, TX 77099

If you have any questions, please contact me at (713) 983-2138.

  
Signature

May 31, 1991  
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE RD.  
HOUSTON, TEXAS 77099

Ref. Case No. 16177

Site Name Gulfstream Aerospace

Date: 6 / 4 / 91

Subject: **CLP Data Review**

From: Michael L. Daggett, Chief, Organic Lab Section; 6E-HL

To: E. Sierra, 6E-SH

A review of the laboratory raw data for the reference site has been completed by members of the Laboratory Section.  
Samples were:

INORGANIC:	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
ORGANIC:	<u>FP-640</u>	<u>FQ-103</u>	_____	_____
	<u>641</u>	<u>FQ-110</u>	_____	_____
	<u>648</u>	↓	_____	_____
	<u>650</u>	↓	_____	_____
	_____	<u>FQ-123</u>	_____	_____

The data was found:

- ( ) Acceptable
- (X) Provisional; use of data requires caution. Problems are noted in Review Summary.
- ( ) Unacceptable; data should not be used. Problems are noted in Review Summary.

Questions regarding the review can be addressed to me.

Attachments

cc: Mahmoud El-Peky, 6E-HL  
Mike Hiatt, EMSL/Las Vegas

# DATA QUALITY ASSURANCE REVIEW

SITE NAME GULFSTREAM AEROSPACE CORPORATION

SITE CODE OKD008155657

PAN FOK0360SAF

CASE NUMBER 16177

LABORATORY WEYERHAUSER LABORATORY AND ANALYTICAL TESTING

## SAMPLE NUMBERS

<u>FP640</u>	<u>FQ113</u>	<u>FQ121</u>	<u>                    </u>
<u>FP641</u>	<u>FQ114</u>	<u>FQ122</u>	<u>                    </u>
<u>FP648</u>	<u>FQ115</u>	<u>FQ123</u>	<u>                    </u>
<u>FP650</u>	<u>FQ116</u>	<u>                    </u>	<u>                    </u>
<u>FQ103</u>	<u>FQ117</u>	<u>                    </u>	<u>                    </u>
<u>FQ110</u>	<u>FQ118</u>	<u>                    </u>	<u>                    </u>
<u>FQ111</u>	<u>FQ119</u>	<u>                    </u>	<u>                    </u>
<u>FQ112</u>	<u>FQ120</u>	<u>                    </u>	<u>                    </u>
<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>

REVIEWER ROBERT TAAFFE, FIT ANALYST, EPA Region VI

*9/25/01*

## DATA EVALUATION

SITE NAME GULFSTREAM AEROSPACE CASE NO. 16177 PAGE 1

Soil samples: FP640, FP641, FP648, FP650, FQ103, FQ110, FQ111, FQ112, FQ113, FQ114, FQ115, FQ116, FQ117, FQ118, FQ119, FQ120, FQ121, FQ122 and FQ123

The data package consisted of 19 soil samples analyzed for full TCL organics. Data qualifications are listed below.

### VOA FRACTION

1. Analytical Parameters: All samples were analyzed using low concentration soil protocols.
2. Surrogates: All surrogate recoveries were within control limits.
3. Blanks: Acetone was detected in the method blanks associated with samples FP640, FP648, FP650, FQ103, FQ110, FQ111, FQ112, FQ113, FQ114, FQ116, FQ117 and FQ121RE. Reported concentrations of acetone in these samples less than ten times its concentration in the associated method blank are considered laboratory contamination.

The following parameters: holding times, mass spectrometer tuning, initial and continuing calibrations, internal standard areas, matrix spike recoveries, duplicate results and TCL identification were evaluated by the Houston EPA Laboratory and data qualifications for these parameters are listed in the attached review.

### ABN FRACTION

1. Analytical Parameters: All samples were analyzed using low concentration protocols with GPC cleanup of the sample extracts. Due to variations from the protocol regarding sample size, GPC cleanup, and dilutions, the quantitation limits for the samples are the low soil CRQLs times the following factors:

2.00	FQ114, FQ115, FQ121
1.99	FP648, FQ111, FQ117, FQ119
1.98	FQ116, FQ120
1.97	FP640, FQ112
1.95	FP650, FQ103, FQ110, FQ118, FQ123, FP650MS, FP650MSD
1.94	FP641

19.9                    FQ113 (10 fold dilution)  
9.95                    FQ122 (5 fold dilution)

Sample FQ113 was diluted and re-analyzed to quantitate acenaphthene, fluorene, phenanthrene, anthracene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene and benzo(g,h,i)perylene. Benzo(k)fluoranthene, undetected in the original analysis, was reported in the dilution. Quantitation limits for this analysis are 995 times the low soil CRQLs. Sample FQ117 was diluted and re-analyzed to quantitate phenanthrene, fluoranthene and pyrene. Quantitation limits in this analysis are 7.96 times the low soil CRQLs. Sample FQ121 was diluted and re-analyzed to quantitate fluoranthene. Quantitation limits for the re-analysis are four times low soil CRQLs. Sample FQ122 was diluted and re-analyzed to quantitate phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene and benzo(b)fluoranthene. Indeno(1,2,3-cd)pyrene and benzo(g,h,i)perylene were reported in the diluted re-analysis but not in the original sample, probably due to matrix interferences in the original analysis. Quantitation limits in the re-analysis are 238.8 times the low soil CRQLs.

2. Method blanks: Phenanthrene, fluoranthene, pyrene, benzo(a)anthracene at concentrations less than their CRQLs and three Tentatively Identified Compounds (TICs) were detected in the method blank. Sample associated with this method blank are FP640, FP641, FP648, FP650, FQ111, FQ112, FQ113, FQ114, FQ115, FQ116, FQ117, FQ118, FQ120, FQ121, FQ122, FQ123 and FP650MS. Concentrations of these analytes in these samples less than five times their method blank concentrations are considered laboratory contamination. Phenanthrene, fluoranthene and pyrene at concentrations less than their CRQLs and two Tentatively Identified Compounds (TICs) were detected in the method blank associated with samples FQ103, FQ110, FQ113DL, FQ117DL, FQ119, FQ121DL, FQ122DL and FP650MSD. Concentrations of these analytes in samples less than five times their method blank concentration are considered laboratory contamination.

3. Other: Dibenzo(a,h)anthracene was reported in the original analysis of sample FQ113, but was not reported in the diluted re-analysis. The reported concentration of this analyte is considered an estimate.

The following parameters: holding times, mass spectrometer tuning, initial and continuing calibration, internal standard areas, surrogate recoveries, matrix spike recoveries, duplicate results and TCL identification were evaluated by the Houston EPA Laboratory and data qualifications for these parameters are listed in the attached review.

#### PESTICIDE/ PCB FRACTION

1. Analytical Parameters: All samples were originally analyzed using low concentration protocols. GPC cleanup was performed on all low concentration sample extracts. Samples FQ113 and FQ122 were re-extracted and re-analyzed using medium concentration protocols. Sample FQ114 was also re-extracted and

re-analyzed. Due to variations in sample size, GPC cleanup and dilutions, quantitation limits for the samples are the following factors multiplied by the low soil CRQLs:

0.97	FQ114RE, FQ114REMS, FQ114REMSD
1.94	FP641
1.95	FP650, FQ103, FQ110, FQ118
1.97	FP640, FQ112
1.98	FQ116, FQ120
1.99	FP648, FQ111, FQ113, FQ117, FQ119, FQ122, FQ650MS, FQ650MSD
2.00	FQ114, FQ115, FQ121, FQ123

2. GC Performance: Linearity check results were out of control limits for 4,4'-DDT on the DB1701 column. The laboratory quantitated 4,4'-DDT and 4,4'-DDD on the second column and prepared a 3 point curve to quantitate 4,4'-DDE on the DB1701 column. No qualifications are placed on the usability of this data. The surrogate was not recovered for sample FQ113 and FQ122 due to matrix interference and retention time shifts cannot be evaluated. The samples were re-extracted and re-analyzed using medium concentration protocols and results were acceptable. No qualifications are placed on the usability of the data.

3. TCL Identification: All TCL identifications reported by the laboratory were acceptable.

The following parameters: holding times, calibration, surrogate recoveries, method blanks, matrix spike recoveries and duplicate results for the original analysis were evaluated by the Houston EPA Laboratory and data qualifications for these parameters are listed in the attached review. Houston EPA Laboratory evaluations were used for all parameters in the re-extracted samples.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
EPA HOUSTON LABORATORY  
10625 FALLSTONE ROAD  
HOUSTON, TX 77099

RESUBMITTED DATA REVIEW REPORT

DATE: June 14, 1991 CASE #: 16177  
\_\_\_\_\_ SAS #: \_\_\_\_\_  
TO: E. Sierra 6E-SH SDG #: MFN276  
USEPA Region 6 SITE NAME: Gulf Stream Aerospace  
FROM: Victor Chapman LAB NAME: Keystone  
ESAT

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

1. The resubmitted information does not effect the data review.
2. "M" and "W" flag corrections were made.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TEXAS 77099

RESUBMITTED DATA REVIEW REPORT

DATE: 7/1/91 CASE #: 16177  
\_\_\_\_\_  
SAS # : \_\_\_\_\_  
TO: REM/RED SDG # : FP640  
C/O E. Sierra (6E-SH) LAB : WEYER  
FROM: Tseng-Ying Fan - ESAT SITE NAME: Gulfstream  
Region 6 Aerospace

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA: (P. 1)

Laboratory responses to CCS results and Region 6 requests.

**A. VOA**

1. Use the corrected Forms II and VIII (P. 5 and 15).
2. Use the corrected Form I's for samples FQ-110, FQ-115 and FP-650 MS/MSD.
3. Use the corrected Form I-TIC for sample FQ-123.

**B. BNA**

1. The laboratory submitted GPC chromatogram for the calibration analysis, but failed to submit GPC deliverables for samples and blanks.
2. Use the corrected Form II (P. 263).
3. Use the revised quantitation limits on the resubmitted Form I's.
4. The laboratory corrected Form I result for anthracene for SBLKT1, but failed to delete "B" flags for anthracene results in associated samples FP-650MSD, FQ-103, FQ-113DL, FQ-117DL, FQ-119, FQ-121DL and FQ-122DL.
5. Sample FQ-121DL: Use the submitted spectra for 2-methylnaphthalene.
6. Sample FQ-117: Use the corrected benzo(g,h,i)perylene result.
7. Use the revised Form I-TIC's.
8. Use the corrected Form VII's.

RESUBMITTED DATA REVIEW REPORT

Continuation Page 2  
In Reference To Case No. 16177 SDG: FP640  
Laboratory/Site WEYER / Gulfstream Aerospace  
From Tseng-Ying Fan - ESAT  
To E. Sierra (6E-SH)  
Date 7/1/91

**C. Pest/PCB**

1. Use the corrected Form I for PBLK1.
2. Use the corrected Form II (P. 1685).
3. The laboratory failed to report some pesticide results >CRQL. In the opinion of this reviewer, quantitation limits for the following compounds are estimated due to possible low bias:

Endrin in sample FQ-117;  
Aldrin, gamma-BHC, Endrin, DDD, DDT and Endrin  
ketone in sample FQ-113; and  
DDD, DDT and Endrin ketone in sample FQ-122.

## COVER SHEET

LABORATORY RESPONSE TO RESULTS OF  
CONTRACT COMPLIANCE SCREENING (CCS)

Response To: (Check one)

☒ Organics CCS☐ Inorganics CCS

JH 6-14-91

Response materials should be sent to the attention of the CCS Coordinator.

Laboratory Name

Weyerhaeuser

Response Date

6-12-91

Date Screening  
Results Received  
at Laboratory

6-3-91

EPA Contract No.

68D90026

Case No.

16177

SDG No.

FP640

Sample Nos.\*

FP640	FQ103	FQ114	FQ119
FP641	FQ110	FQ115	FQ120
FP648	FQ111	FQ116	FQ121
FP650	FQ112	FQ117	FQ122
FP650MS	FQ113	FQ117DL	FQ122DL
FP650MSD	FQ113DL	FQ118	FQ123

\*Only list sample numbers that require reconciliation.

This form is used to identify materials sent in response to results of Contract Compliance Screening (CCS). A separate form must accompany the response for each Case.

Please indicate (on the attached continuation form) which fractions and/or which criteria correspond with your resubmission. Response materials sent to CCS should also be copied to the Region and to EMSL/LV, each with this blue Cover Sheet.

12/12/89

Criterion	Comments
VDA 1A)	Recoveries for all surrogates were incorrect for sample FQ-113. RESP: Hardcopy Form II has been corrected. (p.5) Disk deliverables are correct.
VDA 1B)	Recoveries for S1 and S2 were incorrect for sample FQ-116. RESP: Hardcopy Form II has been corrected (p.5) Disk deliverables are correct.
VDA 2)	Form VIII (p.15): Area for ISI was incorrect for sample FP-650. RESP: Hardcopy and disk deliverables corrected.
VDA 3)	The listed compounds were not identified, but were reported on Form I. RESP: Form I's for samples FP-650MS, FP-650MSD, FQ-110, and FQ-115 were corrected so that the concentration units were given a "u" qualifier. Disk deliverables also corrected.
BNA 1)	Submit GPC chromatograms for all samples and blanks. RESP: Our GPC is not connected to a recorder so chromatograms for all samples and blanks are not available. The GPC calibration curve is being submitted for your review.
	2) Submit GPC chromatograms for all calibration and check analyses with % recoveries marked. RESP: GPC calibration curve submitted for review.

Criterion	Comments
BNA 3)	Form II (p.263): Reported acid surrogate recoveries were 1.33X too high for all samples. RESP: A bug in Formaster causes the detection limits to be calculated incorrectly for soils that have gone through GPC clean-up. Hardcopy Form II and disk deliverables have been corrected for resubmission.
* * BNA 4) (H1.4)	The reported quantitation limits were 2X too high for all samples, except those listed. RESP: See explanation above. Hardcopy Form I and disk deliverables corrected.
BNA 5)	SBLKTI: Anthracene was not identified, but was reported. RESP: Form I for SBLKTI revised and "B" flags for anthracene removed on Forms I for all associated samples.
BNA 6)	Sample FQ-121DL: Spectral data for 2-methylnaphthalene were omitted. RESP: Copy of spectral data for 2-methylnaphthalene printed for submission. See pp. 1239A & 1239B.
7)	Benzo (g,h,i) perylene was reported 7CRODL in sample FQ-117DL, but was not reported in sample FQ-117. RESP: Hardcopy and disk deliverables corrected for sample FQ117.

### Laboratory Response to Results of CCS

Criterion	Comments
BNA 3)	Why were TIC results "X" flagged? RESP: The "X" flag means the TIC's were manually edited. With our current system, it is not possible to automatically send TIC concentrations from the INCOS-50 to Formaster, so the values must be manually entered.
BNA 9)	"B" flag was omitted for the following TIC results. RESP: The "B" flag was added to the appropriate TIC reports. Hardcopy and disk deliverables corrected.
VOA/HI.7	TIC retention time missing. RESP: Hardcopy corrected.
E1.6 (BNA)	Mean RRF on Form 7B is not the same as the value reported on Form 6B. RESP: Hardcopy and disk deliverables corrected.

C:

- 1) form I for PBLK1 was corrected for the correct CRQL
- 2) Form 2E was corrected for MS/MSD samples and for the the surrogate recovery for PBLK1. ~~Form 3E~~
- 3) The problems with CRQL's reported for the following samples are not a problem. No correction were necessary as explained.

FQ-117

Endrin was only detected on the primary column and not the confirmation column.

FQ-113

Gamma-BHC was only detected on the primary column and its retention time was outside of the RT window.

Aldrin was detected on both columns, but the ratio of the concentration on the primary vs the confirmation was 0.3. This does not constitute a hit (the minimum ratio I use is 0.6 and the maximum is 1.4). The new contract addresses this issue, whereas you report both quantitation amounts with a qualifier if the amounts are not the same.

Endrin, DDD was detected on one column only.

DDT ratio of concentration is 0.4

Endrin Ketone retention time on the primary column was outside of the window and the ratio of concentration is 0.3

FQ-122

DDD, DDT was detected on the primary column only

Endrin Ketone retention time on the primary column was outside of the window and the ratio of concentration is 0.2



CONTRACT RESPONSE TO A LETTER OF  
CONTRACT COMPLAINT/INQUIRY FROM A CLIENT

Response To (Client Name)

☒ Original CCS

☐ Duplicate CCS

Response to Client should be sent with approval of the CCS Coordinator.

Laboratory Name WEYER

Response Date 10/1/87

Approved  
by  
Signature  
Date

EPA Contract No. 68090026

Case No. 10177

SDG No. FP640

Sample No. FP640

EQ 19

FP641

EQ 20

FP650

EQ 21

EQ 11

EQ 16

EQ 17

\*Only list sample numbers that require reanalysis.

This form is used to identify materials sent in response to requests for Contract Compliance Screening (CCS). A separate form must accompany the response for each Case.

Please indicate (on the attached continuation sheet) which fractions and/or which criteria correspond with your reanalysis. Response materials sent to CCS should also be copied to the Region and to EMSL/AV, each with this blue Cover Sheet.

LABORATORY RESPONSE TO RESULTS OF CCS  
(DISCREPANCIES WITH BACKLOG REPORT 7/11/91)

CASE 16177  
SDG FP640

The original data was submitted on 5/10/91. The first CCS report was received on 6/3/91. Our response was mailed on 6/12/91 and contained two discrepancies. First, criterion E1.7 had been assigned to the wrong fraction. The fraction for this error should be VOA not BNA. Please confirm. Second, pesticide criterion I was reported as noncompliant. All the pesticide samples were checked and only <sup>9m</sup> samples FQ116 and FQ117 contained DDT compounds and required a curve. The curves were submitted with the original data on pages 1755 and 1761a, respectively. Pesticide samples FP640, FP641, FP650, FQ111, FQ116, FQ117, FQ119, FQ120, FQ121 were compliant upon submission of the original data and should receive an "F" status on the backlog report. Please review your records.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TX 77099

MEMORANDUM

Date: August 3, 1991  
Subject: CLP Data Review  
From: Mahmoud El-Feky, *M. El-Feky* 6E-HO, Region 6  
To: Michael Daggett, Chief, Organic Section, Houston  
Branch, Region 6

Attached is the data review summary for Case # 16177 (RE)  
SDG # FQ113RE  
Site Gulfstream  
Aerospace Corp.

Data was found: ☒ (X) Provisional  
☐ ( ) Unacceptable

Action required by TPO: ☐ ( ) Yes  
☒ (X) No

**COMMENT:**

1. Re-extractions exceeded holding time limits for all samples.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE RD.  
HOUSTON, TEXAS 77099

Ref. Case No. 16177

Site Name Gulfstream

Date: 8 / 5 / 91

Subject: CLP Data Review

From: Michael L. Daggett, Chief, Organic Lab Section; 6E-HL

To: E. Sierra, 6E-SH

A review of the laboratory raw data for the reference site has been completed by members of the Laboratory Section.  
Samples were:

INORGANIC:				
ORGANIC:	<u>EQ-113RE</u>			
	<u>114RE</u>			
	<u>122RE</u>			

The data was found:

- ☐ Acceptable
- ☒ Provisional; use of data requires caution. Problems are noted in Review Summary.
- ☐ Unacceptable; data should not be used. Problems are noted in Review Summary.

Questions regarding the review can be addressed to me.

Attachments

cc: Mahmoud El-Feky, 6E-HL  
Mike Hiatt, EMSL/Las Vegas

In Reference to Case No(s):  
16177RE SDG: FQ113RE

REGIONAL/LABORATORY COMMUNICATION SYSTEM  
FAX Record Log

Date of FAX: August 5, 1991  
Laboratory Name: WEYER  
Lab Contact: Dennis Catalano

Region: 6  
Regional Contact: Tseng-Ying Fan - ESAT

FAX initiated by: Laboratory X Region

In reference to data for the following fractions:

PEST

Summary of Questions/Issues:

1. Wrong DBC amounts were indicated in the raw data for all Evaluation Mixture C analyses. Please verify.
2. The reviewer could not reproduce the reported surrogate recoveries. Please show an example of calculation.
3. The injection volume for samples FQ-113RE and FQ-122RE was 2ul, but the reported injection volume was 1ul for the associated calibrations. Please explain.

Please respond to the above items. Region 6 resubmissions may be included with the CCS response or sent separately within 10 days to:

US EPA Region 6 Laboratory  
10625 Fallstone Road  
Houston, TX 77099

If you have any questions, please contact me at (713) 983-2138.

Tseng-Ying Fan  
Signature

August 5, 1991  
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

## COVER SHEET

LABORATORY RESPONSE TO RESULTS OF  
CONTRACT COMPLIANCE SCREENING (CCS)

Response To: (Check one)

☒ Organics CCS☐ Inorganics CCS

Response materials should be sent to the attention of the CCS Coordinator.

Laboratory Name

Weyerhaeuser

Response Date

7-30-91Date Screening  
Results Received  
at Laboratory7-29-91

EPA Contract No.

68D90026

Case No.

16177

SDG No.

FQ113

Sample Nos.

\*Only list sample numbers that require reconciliation.

This form is used to identify materials sent in response to results of Contract Compliance Screening (CCS). A separate form must accompany the response for each Case.

Please indicate (on the attached continuation form) which fractions and/or which criteria correspond with your resubmission. Response materials sent to CCS should also be copied to the Region and to EMSL/LV, each with this blue Cover Sheet.



QUESTION #1

07/01/91

	amnt	std	db1701	db608	db1701	db608
	ug/ul	inj	pkht	pkht	pkht/amnt	pkht/amnt
vala	0.05		26137	39967	522740	799340
valb	0.1		44496	67058	444960	670580
valc	0.2		90379	137852	451895	689260
nda	0.1		67804	99225	678040	992250

7/09/91

	amnt	std	db1701	db608	db1701	db608
	ug/ul	inj	pkht	pkht	pkht/amnt	pkht/amnt
vala	0.05		26189	38588	523780	771760
valb	0.1		48983	73711	489830	737110
valc	0.2		106816	162733	534080	813665
nda	0.1		63319	92462	633190	924620

QUESTION #2

F USED	633000	CALC	AMNT	CALC	AMNT	dil=1/10split x 1/2gpc split
SURROGATE	DATE	DB1701	2ul inj	ug/ml		RECOVERY
RECOVERY	ANALYZED	PKHT	NG INJ	(1ml fv)		(UG/ML)*20dil/(20ug*0.2ml ADDED)
BLK1	07/10	120446	0.381	0.190		47.57%
Q114	07/10	155511	0.491	0.246		61.42%
Q114MS	07/10	139455	0.441	0.220		55.08%
Q114MSD	07/10	136620	0.432	0.216		53.96%

F USED	678000	CALC	AMNT	CALC	AMNT	dil=1/10 split
SURROGATE	DATE	DB1701	2ug inj	ug/ml		RECOVERY
RECOVERY	ANALYZED	PKHT	NG INJ	(1ml fv)		(UG/ML)*10dil/(20ug*0.05ml ADDED)
BLK2	07/03	128657	0.406	0.203		101.62%
Q113	07/03	124944	0.395	0.197		98.69%
Q122	07/03	109371	0.346	0.173		86.39%
Q122MS	07/03	129020	0.408	0.204		101.91%
Q122MSD	07/03	140512	0.444	0.222		110.99%

NOTE FINAL VOLUME IS 1ML, SO (NG/INJ)/2 IS UG/ML

QUESTION #3

All injections were 2ul. The raw data reporting 1ul is wrong



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TEXAS 77099

ORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 16177 (Reanalysis) SITE Gulfstream Aerospace Corp.  
LABORATORY WEYER NO. OF SAMPLES 3  
CONTRACT# 68-D9-0026 MATRIX Soil  
SDG# FQ113RE REVIEWER (IF NOT ESD) ESAT  
SOW# RAS IFB 4/89 REVIEWER'S NAME Tseng-Ying Fan  
TPO: ACTION FYI \* COMPLETION DATE August 3, 1991  
ACCT# 1TGBDNC8 SF# TGBUZZ

SAMPLE NO. FQ-113RE \_\_\_\_\_  
FQ-114RE \_\_\_\_\_  
FQ-122RE \_\_\_\_\_  
\_\_\_\_\_

DATA ASSESSMENT SUMMARY

	VOA	BNA	PEST	OTHER
1. HOLDING TIMES	<u>N/A</u>	<u>N/A</u>	<u>M</u>	<u>N/A</u>
2. GC/MS TUNE/INSTR. PERFORM.	<u>N/A</u>	<u>N/A</u>	<u>O</u>	<u>N/A</u>
3. CALIBRATIONS	<u>N/A</u>	<u>N/A</u>	<u>O</u>	<u>N/A</u>
4. BLANKS	<u>N/A</u>	<u>N/A</u>	<u>O</u>	<u>N/A</u>
5. SURROGATES	<u>N/A</u>	<u>N/A</u>	<u>O</u>	<u>N/A</u>
6. MATRIX SPIKE/DUP	<u>N/A</u>	<u>N/A</u>	<u>O</u>	<u>N/A</u>
7. OTHER QC	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
8. INTERNAL STANDARDS	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
9. COMPOUND IDENTIFICATION	<u>N/A</u>	<u>N/A</u>	<u>O</u>	<u>N/A</u>
10. SYSTEM PERFORMANCE	<u>N/A</u>	<u>N/A</u>	<u>O</u>	<u>N/A</u>
11. OVERALL ASSESSMENT	<u>N/A</u>	<u>N/A</u>	<u>M</u>	<u>N/A</u>

O = Data had no problems/or qualified due to minor problems.  
M = Data qualified due to major problems.  
Z = Data unacceptable.  
X = Problems, but do not affect data.  
NA = Not applicable.

ACTION ITEMS: Re-extractions exceeded contractual holding time limits for all samples.

AREA OF CONCERN:

NOTABLE PERFORMANCE: The data package was 5 days early. The laboratory also submitted MS/MSD data.

**COMMENTS/CLARIFICATIONS  
REGION 6 CLP QA REVIEW**

**CASE 16177(RE) SDG: FQ113RE SITE Gulfstream Aerospace LAB WEYER**

The following is a summary of sample qualifiers used by Region 6 in reporting this CLP data:

<u>No.</u>	<u>Acceptable</u>	<u>Provisional</u>	<u>Unacceptable</u>
VOA	N/A		
BNA	N/A		
PEST		3	
OTHER	N/A		

**COMMENTS:** The case consisted of Pest/PCB data for the reanalyses of 3 soil samples. The data package arrived 5 days early for the turnaround time specified on the reanalysis request. These samples were originally analyzed at wrong levels or had carry-over interferences. Sample FQ-114RE was reanalyzed at low level, while samples FQ-113RE and FQ-122RE were reanalyzed at medium level. Sample re-extractions exceeded contractual holding time limits. Endrin ketone was reported >CRQL in sample FQ-113RE. All samples are provisional due to holding time deficiencies.

1. **Holding Times** - Provisional. All samples were re-extracted 73 days past contractual holding time limits. Results are estimated for all samples.

2. **Tuning/Performance** - Acceptable. Pest/PCB analysis met instrument performance criteria.

3. **Calibrations** - Acceptable. Pest/PCB calibrations generally met QC guidelines.

4. **Blanks** - Acceptable. Method blanks met QC requirements.

5. **Surrogates** - Acceptable. The reviewer could not reproduce the reported surrogate recoveries, but verified that surrogate recoveries were generally within QC limits for all samples.

6. **Matrix Spike/Matrix Spike Duplicate** - Acceptable. MS/MSD recoveries were within QC limits.

7a. **Compound Identity/Data Completeness** - Acceptable. Endrin ketone was reported >CRQL in sample FQ-113RE. DDE, DDT and Endosulfan sulfate were reported <CRQL in sample FQ-114RE. GC/MS confirmation was not required. The data package was complete, except for some needed clarifications. The laboratory was notified of the resubmissions (see attached FAX Record Log).

8. **Case Assessment** - Data are provisional for all samples due to holding time deficiencies.

LABORATORY RESPONSE TO RESULTS OF  
CONTRACT COMPLIANCE SCREENING (CCS)

Response To: (Check one)

☒ Organics CCS☐ Inorganics CCS

Response materials should be sent to the attention of the CCS Coordinator.

Laboratory Name

Weyerhaeuser

Response Date

8/13/91Date Screening  
Results Received  
at Laboratory8/9/91

EPA Contract No.

168D900316

Case No.

16177

SDG No.

EQ113

Sample Nos.\*

EQ114

\*Only list sample numbers that require reconciliation.

This form is used to identify materials sent in response to results of Contract Compliance Screening (CCS). A separate form must accompany the response for each Case.

Please indicate (on the attached continuation form) which fractions and/or which criteria correspond with your resubmission. Response materials sent to CCS should also be copied to the Region and to EMSL/LV, each with this blue Cover Sheet.

[illegible]

## Laboratory Response to Results of CCS

[illegible]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TEXAS 77099

RESUBMITTED DATA REVIEW REPORT

DATE: 8/15/91 CASE #: 16177 (Reanalysis)  
\_\_\_\_\_  
SAS # : \_\_\_\_\_  
TO: REM/RED SDG # : FQ113RE  
C/O E. Sierra (6E-SH) LAB : WEYER  
FROM: Tseng-Ying Fan - ESAT SITE NAME: Gulfstream  
Region 6 Aerospace

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

Laboratory responses to CCS results.

**A. Pest/PCB**

1. Calibration curves for DDT derivatives are submitted.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TEXAS 77099

RESUBMITTED DATA REVIEW REPORT

DATE: 8/16/91 CASE #: 16177  
\_\_\_\_\_  
SAS # : \_\_\_\_\_  
TO: REM/RED SDG # : FP640  
C/O E. Sierra (6E-SH) LAB : WEYER  
FROM: Tseng-Ying Fan - ESAT SITE NAME: Gulfstream  
Region 6 Aerospace

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

Laboratory responses to CCS results.

**A. Pest/PCB**

1. This resubmission has no effect on the original data.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
HOUSTON BRANCH  
10625 FALLSTONE ROAD  
HOUSTON, TEXAS 77099

RESUBMITTED DATA REVIEW REPORT

DATE: 8/15/91 CASE #: 16177(Reanalysis)  
8/16/91 SAS # : \_\_\_\_\_  
TO: REM/RED SDG # : FQ113RE  
C/O E. Sierra (6E-SH) LAB : WEYER  
FROM: Tseng-Ying Fan - ESAT SITE NAME: Gulfstream  
Region 6 Aerospace

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

Laboratory responses to CCS results (8/15/91).

**A. Pest/PCB**

1. Calibration curves for DDT derivatives are submitted.

Laboratory responses to Region 6 request (8/16/91).

**A. Pest/PCB**

1. Use the corrected standard data (P. 62 and 140).



## **APPENDIX D**

### **SAMPLING DOCUMENTATION**

[illegible]

**Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files**

6-05349

6-05360

CHAIN OF CUSTODY RECORD

PROJ. NO.		PROJECT NAME				NO. OF CON- TAINERS	REMARKS									
SAMPLERS: (Signature) <i>Kushner</i> <i>Ludlow Stojan</i> <i>GPatterson</i> <i>1-17</i> <i>Robert Taffee</i>																
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION											
08	04-02-91	1053-1113		X	North end of road Subsurface	1	1									6-074619 ✓ MEN 283
01	04-02-91	1106-1112		X	North end of road	1	1									6-0746591 ✓ MEN 276
02	04-02-91	1145-1150		X	North end of road	1	1									6-074596 ✓ MEN 277
09	04-02-91	1150-1154		X	Road split	1	1									6-077639 ✓ MEN 820
04	04-02-91	1207-1214		X	North of Southern drainage	1	1									6-074603 ✓ MEN 279 QA/QC
07	04-02-91	1225-1236		X	Subsurface north of southern drainage	1	1									6-074615 ✓ MEN 282
03	04-02-91	1241-1244		X	Subsurface south of boundary at road split	1	1									6-074599 ✓ MEN 278
05	04-02-91	1247-1249		X	Southern end of west road	1	1									6-074607 ✓ MEN 280
06	04-02-91	1259-1302		X	South end of road subsurface	1	1									6-074611 ✓ MEN 281
13	04-03-91	0955-1005		X	North side of storage area	1	1									6-074639 ✓ MEN 814
14	04-03-91	1012-1015		X	Drainage canal intersection adjacent to storage area	1	1									6-074643 ✓ MEN 815
15	04-03-91	1020-1023		X	East of southern drainage culvert	1	1									6-074647 ✓ MEN 816
16	04-03-91	1025-1029		X	East of southern drainage culvert	1	1									6-0746521 ✓ MEN 817
17	04-03-91	1041-1047		X	Southern end of Drainage Ditch	1	1									6-0746535 ✓ MEN 818
18	04-03-91	1030-1036		X	North side of heavy gate	1	1									6-074659 ✓ MEN 819

Relinquished by: (Signature) <i>GPatterson</i>	Date / Time <i>4/3/11 1500</i>	Received by: (Signature) <i>EX</i>	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks <i>For E+H 11 # 2720469102</i>	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-05350

**Office of Enforcement**

INORGANIC  
CHAIN OF CUSTODY RECORD

**First International Bldg., 1201 Elm St.  
Dallas, Texas 75270**

[illegible]

**Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files**

6-05262

CHAIN OF CUSTODY RECORD

PROJ. NO.		PROJECT NAME					NO. OF CON- TAINERS	REMARKS									
SAMPLERS: (Signature) <i>Kenneth W. Steger</i>																	
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION												
08	04-02-91	11:53		X	North end of road subsurface		1										split 6-077641
01	4-12-91	11:06		X	North end of road		1										6-077642
02	04-02-91	11:45		X	West of footing area on road		1										6-077643
19	4-02-91	11:50		X	road split		1										6-077644
04	04-02-91	12:07		X	North of southern drainage		1										6-077645
07	04-02-91	12:23		X	Subsurface north of southern drainage		1										6-077646
03	04-02-91	12:29		X	Lower roadway south of footing at road split		1										6-077647
05	04-02-91	12:47		X	Southern end of west road surface		1										6-077648
06	04-02-91	12:59		X	South end of road subsurface		1										6-077649
Relinquished by: (Signature) <i>Kenneth W. Steger</i>		Date / Time 04-02-91 13:55		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Date / Time		Received by: (Signature)							
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)							
Relinquished by: (Signature)		Date / Time		Received for Laboratory by: (Signature)		Date / Time		Remarks									

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-05351

[illegible]

**Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files**

6-05361



USEPA CONTRACT LABORATORY PROGRAM  
SAMPLE MANAGEMENT OFFICE  
P.O. BOX 818 ALEXANDRIA VA 22313  
703 557-2490 FTS 557-2490

CASE NO: 16177

SAS NO:  
(IF APPLICABLE)

# INORGANIC TRAFFIC REPORT

FOR CLP USE ONLY

TYPE OF ACTIVITY (CIRCLE ONE) ①  
SUPERFUND—PA ⑤ ESI RIFS RD RA ER  
NPLD OWM OTHER  
NON-SUPERFUND— PROGRAM

SITE NAME:  
Cull-Strom Aerospace Corporation  
CITY, STATE: SITE SPILL ID:  
Bethany, OK

REGION NO: SAMPLING COMPANY ②  
6 ICE FIT  
SAMPLER: (NAME)  
Robert Tenaffe

SHIP TO: Keystone Environmental  
8300 West Park Drive  
Houston, TX 77063

ATTN: Kathy Doty

SAMPLING DATE: 9/2/91-9/3/91 ④  
1053 on 9/2/91 1211 on 9/3/91  
BEGIN: 04-02-91 END: 04-03-91

DATE SHIPPED: 4/3/91 CARRIER: EED ⑤

AIRBILL NO: 2726469102

SAMPLE DESCRIPTION  
(ENTER IN BOX A) ⑥  
1. SURFACE WATER 4. SOIL  
2. GROUND WATER 5. SEDIMENT  
3. LEACHATE 6. OIL (SAS)  
7. WASTE (SAS)

DOUBLE VOLUME REQUIRED FOR MATRIX  
SPIKE/DUPLICATE AQUEOUS SAMPLE

SHIP MEDIUM AND HIGH CONCENTRATION  
SAMPLES IN PAINT CANS

SEE REVERSE FOR ADDITIONAL  
INSTRUCTIONS

CLP SAMPLE NUMBER (FROM LABELS)	SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	CONCENTRATION L = LOW M = MED H = HIGH (SAS)	RAS ANALYSIS							SPECIAL HANDLING	STATION LOCATION
			TOTAL METALS	CYANIDE	DISSOLVED METALS	HIGH ONLY (SAS)					
						SULFIDE	PH	COMBUSTIBILITY	OXIDANTS		
MEN 283	4	L	X	X							St. 08
MEN 276	4	L	X	X							St. 01
MEN 277	4	L	X	X							St. 02
MEN 828	4	L	X	X							St. 19
MEN 279	4	L	X	X					QA/QC		St. 04
MEN 282	4	L	X	X							St. 07
MEN 278	4	L	X	X							St. 03
MEN 280	4	L	X	X							St. 05
MEN 281	4	L	X	X							St. 06
MEN 284	4	L	X	X							St. 09
MEN 814	5	L	X	X							St. 13
MEN 815	5	L	X	X							St. 14
MEN 816	5	L	X	X							St. 15
MEN 817	5	L	X	X							St. 16
MEN 818	5	L	X	X							St. 17
MEN 819	5	L	X	X							St. 18
MEN 284	4	L	X	X							St. 9
MEN 809	4	L	X	X							St. 10
MEN 812	4	L	X	X							St. 11
MEN 813	5	L	X	X							St. 12

EPA Form 2075-6 (8-87)

WHITE — SMO COPY

PINK — CLIENT COPY

WHITE — LAB COPY FOR RETURN TO SMO

YELLOW — LAB COPY



<b>1. Type of Activity (Check one)</b> <input type="checkbox"/> ENF <input type="checkbox"/> NPLD <input type="checkbox"/> RA <input checked="" type="checkbox"/> SI <input type="checkbox"/> STSI <input type="checkbox"/> ER <input type="checkbox"/> O&M <input type="checkbox"/> RD <input type="checkbox"/> ST <input type="checkbox"/> Other (Specify) <input type="checkbox"/> ESI <input type="checkbox"/> PA <input type="checkbox"/> RIFS <input type="checkbox"/> STPA		<b>2. Region Number</b> 6		<b>Sampling Co.</b> ICF F17		<b>4. Date Shipped</b> 4/13/91		<b>Airbill Number</b> 2720068194		<b>5. Sample Description (Enter in Column A)</b>  1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)	
<b>Sampler (Name)</b> Traffic		<b>Carrier</b> FED E		<b>3. Site</b> Wyo. Dept. of Transportation 3294 Wyo. Rd. 1000 Hwy 3 WTC 2F25 Federal Way, WA 98003 Attn: Bonnie Chaud		Triple volume required for matrix spike/duplicate aqueous sample.  Ship medium and high concentration samples in paint cans.  See reverse for additional instructions.					
<b>Non-Superfund Program</b>  <b>Site Name</b> Civilian Aerospace Corporation		<b>City, State</b> Bethel ME		<b>Site Spill ID</b> OK							

CLP Sample Number (From labels)	(A) Sample Description (From box 1)	(B) Concentration L=low M=med H=high	(C) RAS Analysis			(D) Special Handling	(E) Station Location	(F) Date/Time of Sample Collection	(G) Corresponding CLP Inorganic Sample Number
			VOA	BNA	Pest/PCB				
FQ112	5	L	X	X	X		St. 08	01-02-91 1053-1103	MEN 283
FP640	5	L	X	X	X		St. 01	04-02-91 1106-1112	MEN 276
FP641	5	L	X	X	X		St. 02	04-02-91 1145-1152	MEN 277
FQ123	5	L	X	X	X		St. 19	04-02-91 1150-1154	MEN 820
FP650	5	L	X	X	X	QA/QC	St. 04	04-02-91 1243-1244	MEN 279
FQ111	5	L	X	X	X		St. 07	04-02-91 1225-1226	MEN 282
FP648	5	L	X	X	X		St. 03	04-02-91 1229-1241	MEN 278
FQ103	5	L	X	X	X		St. 05	04-02-91 1249-1249	MEN 280
FQ110	5	L	X	X	X		St. 06	04-02-91 1259-1302	MEN 281
<del>FQ113</del>	<del>5</del>	<del>L</del>	<del>X</del>	<del>X</del>	<del>X</del>		<del>St. 09</del>	<del>04-02-91</del>	<del>MEN 284</del>
FQ117	5	L	X	X	X		St. 13	04-03-91 0955-10005	MEN 814
FQ118	5	L	X	X	X		St. 14	04-03-91 1012-1015	MEN 815
FQ119	5	L	X	X	X		St. 15	04-03-91 1020-1023	MEN 816
FQ120	5	L	X	X	X		St. 16	04-03-91 1025-1028	MEN 817
FQ121	5	L	X	X	X		St. 17	04-03-91 1041-1047	MEN 818
FQ122	5	L	X	X	X		St. 18	04-03-91 1030-1036	MEN 819
FQ113	5	L	X	X	X		St. 9	04-03-91 1100-1107	MEN 284
FQ114	5	L	X	X	X		St. 10	04-03-91 1155-1200	MEN 809
FQ115	5	L	X	X	X		St. 11	04-03-91 1204-1211	MEN 812
FQ116	5	L	X	X	X		St. 12	04-03-91 1141-1144	MEN 813



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI  
1445 ROSS AVENUE, SUITE 1200  
DALLAS, TEXAS 75202

4/3/91  
(DATE)

RECEIPT FOR SAMPLES

NAME AND TITLE OF E.P.A. REPRESENTATIVE:

ROBERT TAAFFE

F.I.T. Chemist

Robert Taaffe  
(Signature)

SAMPLES COLLECTED:

SAMPLE NUMBER	TIME	PLACE COLLECTED	TYPE	VOLUME	SPLIT SAMPLE	
					REQUESTED	PROVIDED
1	1106 1112	NORTH END OF ROAD	Soil	24 oz.	✓	✓
2	1145 1150	WEST OF Tooling Area	Soil	24 oz.	✓	✓
3	1229 1241	SOUTH OF Foundry	Soil	24 oz.	✓	✓
4	1207 1214	NORTH OF Southern Drain	Soil	24 oz.	✓	✓
5	1247 1249	Southern end OF ROAD	Soil	24 oz.	✓	✓
6	1259 1302	Southern end OF ROAD - sub	Soil	24 oz.	✓	✓
7	1223 1226	Subsurface Near Southern Drain	Soil	24 oz.	✓	✓
8	1053 1103	North end of ROAD subsurface	Soil	24 oz.	✓	✓
9	1100 1107	West Drainage Ditch	Soil	24 oz.	✓	✓

ACKNOWLEDGMENT OF FACILITY REPRESENTATIVE

The undersigned acknowledges that the samples described above have been collected.

NAME, TITLE AND ADDRESS OF FACILITY REPRESENTATIVE:

William S. Clinebaugh, SPECIAL SUPERVISOR

GULFSTREAM Aerospace Corp., Bethany, Oklahoma

William S. Clinebaugh  
(Signature)

4/3/91  
(Date)

DISTRIBUTION:

One copy facility representative  
One copy for inspector's records  
Original to Regional Office



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI

1445 ROSS AVENUE, SUITE 1200  
DALLAS, TEXAS 752024/3/91  
(DATE)RECEIPT FOR SAMPLESNAME AND TITLE OF E.P.A. REPRESENTATIVE:

ROBERT TAAFFE

F. I. T. Chemist

Robert Taaffe  
(Signature)SAMPLES COLLECTED:

SAMPLE NUMBER	TIME	PLACE COLLECTED	TYPE	VOLUME	SPLIT SAMPLE	
					REQUESTED	PROVIDED
10	1155 1200	surface soil background	soil	24 oz.	✓	✓
11	1204 1211	subsurface soil - back	soil	24 oz.	✓	✓
12	1141 1149	Sediment	soil	24 oz.	✓	✓
13	0755 1055	north side of storage	soil	24 oz.	✓	✓
14	1012 1015	East of storage area	soil	24 oz.	✓	✓
15	1020 1023	Drainage culvert	soil	24 oz.	✓	✓
16	1025 1028	Drainage culvert	soil	24 oz.	✓	✓
17	1041 1047	southern end of ditch	soil	24 oz.	✓	✓
18	1030 1036	north side of east gate	soil	24 oz.	✓	✓

ACKNOWLEDGMENT OF FACILITY REPRESENTATIVE

The undersigned acknowledges that the samples described above have been collected.

NAME, TITLE AND ADDRESS OF FACILITY REPRESENTATIVE:

GULFSTREAM Aerospace Corp.

Bethany, Oklahoma

(Signature)

4/3/91  
(Date)DISTRIBUTION:One copy facility representative  
One copy for inspector's records  
Original to Regional Office



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI

1445 ROSS AVENUE, SUITE 1200  
DALLAS, TEXAS 752024/3/91  
(DATE)RECEIPT FOR SAMPLES

NAME AND TITLE OF E.P.A. REPRESENTATIVE:

ROBERT TAAFFE

F.I.T. Chemist

Robert Taaffe  
(Signature)SAMPLES COLLECTED:

SAMPLE NUMBER	TIME	PLACE COLLECTED	TYPE	VOLUME	SPLIT SAMPLE	
					REQUESTED	PROVIDED
19	1150 1154	West side at Road Split	soil	24 oz.	✓	✓
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

ACKNOWLEDGMENT OF FACILITY REPRESENTATIVE

The undersigned acknowledges that the samples described above have been collected.

NAME, TITLE AND ADDRESS OF FACILITY REPRESENTATIVE:

Gulfstream Aerospace Corp. Bixham, Oklahoma

\_\_\_\_\_  
(Signature)4/3/91  
(Date)DISTRIBUTION:One copy facility representative  
One copy for inspector's records  
Original to Regional Office

## **APPENDIX E**

### **FEDERAL EXPRESS AIRBILL**

# AIRBILL

USE THIS AIRBILL FOR DOMESTIC SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.  
USE THE INTERNATIONAL AIRWAYBILL FOR SHIPMENTS TO PUERTO RICO.  
QUESTIONS? CALL 800-230-5385 TOLL FREE.

PACKAGE  
TRACKING NUMBER

2720469194

## SENDER'S COPY

Express Account Number 2720469194 Date

Please Print

Your Phone Number (Very Important)

To (Recipient's Name) Please Print

Recipient's Phone Number (Very Important)

Department/Floor No.

Company

Department/Floor No.

Exact Street Address (We deliver only to R.O. Boxes or R.O. Zip Codes)

State

ZIP Required

City

State

ZIP Required

REFERENCE INFORMATION (FIRST 24 CHARACTERS WILL APPEAR ON INVOICE)

IF HOLD FOR PICK-UP, Print FEDEX Address Here

Street Address

City

State

ZIP Required

☐ Bill Recipient's FedEx Acct. No.

☐ Bill 3rd Party FedEx Acct. No.

☐ Bill Credit Card

Expiration Date

FEDEX

DELIVERY AND SPECIAL HANDLING

PACKAGES

WEIGHT  
IN POUNDS  
ONLY

YOUR DECLARED  
VALUE  
(See right)

OVER  
SIZE

☐ OVERNIGHT  
LETTER\*

1 ☐ HOLD FOR PICK-UP (Print in box 14)

2 ☒ DELIVER WEEKDAY

3 DELIVER SATURDAY (Extra charge) ☐

4 DANGEROUS GOODS  
(Extra charge)

5 CONSTANT SURVEILLANCE SERVICE (CSS)  
(Extra charge) (Package Signature Not Applicable)

6 DRY ICE (Extra charge) (See 14)

7 OTHER SPECIAL SERVICE

8

9 SATURDAY PICK-UP  
(Extra charge)

10

11

12 HOLIDAY DELIVERY (if altered)  
(Extra charge)

1 155

2 159

3

4

5

6

7

8

9

10

11

12

Total

Total

Total

214

Received At

1 ☐ Regular Stop

2 ☐ On-Call Stop

3 ☐ Drop Box

4 ☐ B.S.C.

5 ☐ Station

FEDEX Corp. Employee No.

Date/Time for FEDEX Use

## SERVICE CONDITIONS, EXCLUDED VALUE AND LIMIT OF LIABILITY

Use of this airbill constitutes your agreement to the service conditions in our current Service Guide which is available upon request. See back of sender's copy of this airbill for further information.

We will not be responsible for loss or damage in excess of \$100 per package, whether the package is insured or not, unless you specifically declare a higher value and pay the additional \$100 per additional \$100 of value. In the event of a claim, the maximum amount payable shall be the actual value of the package, up to the limit of \$100 per package. Federal Express reserves the right to refuse to deliver any package if it is found to be damaged, lost, or stolen. Federal Express will not be responsible for any loss or damage to the contents of the package, as well as for loss of or damage to the package itself, unless the package is properly packed and labeled. Federal Express will not be responsible for any loss or damage to the contents of the package, as well as for loss of or damage to the package itself, unless the package is properly packed and labeled.

In the event of a claim, the maximum amount payable shall be the actual value of the package, up to the limit of \$100 per package. Federal Express will not be responsible for any loss or damage to the contents of the package, as well as for loss of or damage to the package itself, unless the package is properly packed and labeled.

Sender authorizes Federal Express to deliver the shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.

Release

Signature:

Federal Express Use

Base Charges

Declared Value Charge

Other 1

Other 2

Total Charges

PART #2041736800  
REVISION DATE 10/88  
PRINTED IN U.S.A. SICEF

009

© 1988 F.E.C.  
12/88

MULTIPLE PACKAGE  
SHIPMENT LABELS

2720469194

2720469194

2720469194

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2720469194

**AIRBILL**  
**MULTIPLE PACKAGE**  
**SHIPMENT LABELS**

**AIRBILL**  
 USE THIS AIRBILL FOR DOMESTIC SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.  
 USE THE INTERNATIONAL AIRWAYBILL FOR SHIPMENTS TO PORTS ABROAD.  
 QUESTIONS? CALL 800-230-6000 TOLL FREE.

**PACKAGE**  
**TRACKING NUMBER**

**2720469102**

4/3/91  
 2720469102

2720469102

**SENDER'S COPY**

8831407505

Account Number Date

To (Recipient's Name) Please Print Recipient's Phone Number (Very Important)

ICC

Print Your Phone Number (Very Important)

Company Department/Floor No.

8831407514

Department/Floor No.

Exact Street Address (No. Street, Box, P.O. Box, etc.)

8831407523

State ZIP Required

City State ZIP Required

ORIGIN INFORMATION (FIRST 24 CHARACTERS WILL APPEAR ON INVOICE.)

IF BOLD FOR PICK-UP, Print FEDEX Address Here

8831407523

Bill Recipient's FedEx Acct. No. Bill 3rd Party FedEx Acct. No. Bill Credit Card

City State ZIP Required

8831407532

DELIVERY AND SPECIAL HANDLING

PACKAGES WEIGHT IN POUNDS ONLY FROM DECLARED VALUE (See rates)

Federal Express Use Base Charges

8831407532

1 ☐ HOLD FOR PICK-UP (P.O. Box 1)

2 ☒ DELIVER WEEKDAY

Declared Value Charge

8831407541

3 DELIVER SATURDAY (Extra charge)

4 ☐ DANGEROUS GOODS (Extra charge)

Other 1

8831407541

5 ☐ CONSTANT SURVEILLANCE SERVICE (CSS) (Extra charge) (Please Signatures Not Applicable)

6 ☐ DRY ICE (See rates)

Other 2

8831407541

7 ☐ OTHER SPECIAL SERVICE

8 ☐ SATURDAY PICK-UP (Extra charge)

Total Charges

8831407541

9 ☐ HOLIDAY DELIVERY (if offered) (Extra charge)

10 ☐

11 ☐

8831407541

12 ☐

13 ☐

14 ☐

8831407541

15 ☐

16 ☐

17 ☐

8831407541

18 ☐

19 ☐

20 ☐

8831407541

21 ☐

22 ☐

23 ☐

8831407541

24 ☐

25 ☐

26 ☐

8831407541

27 ☐

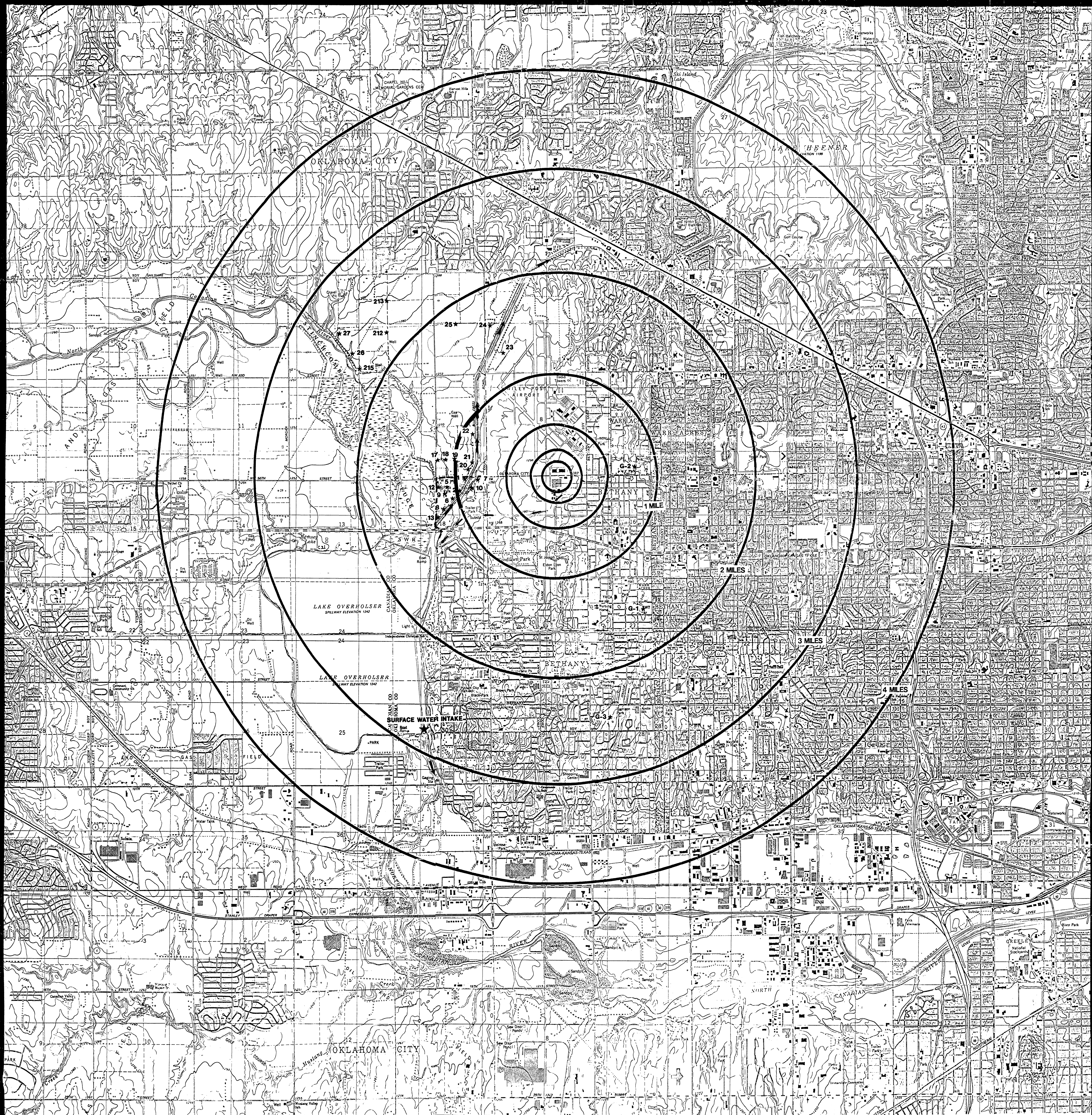
28 ☐

29 ☐

## **APPENDIX F**

### **FOUR MILE TARGET DISTANCE LIMIT**





## APPENDIX F

### FOUR MILE TARGET DISTANCE LIMIT

GULFSTREAM AEROSPACE CORPORATION

BETHANY, OKLAHOMA

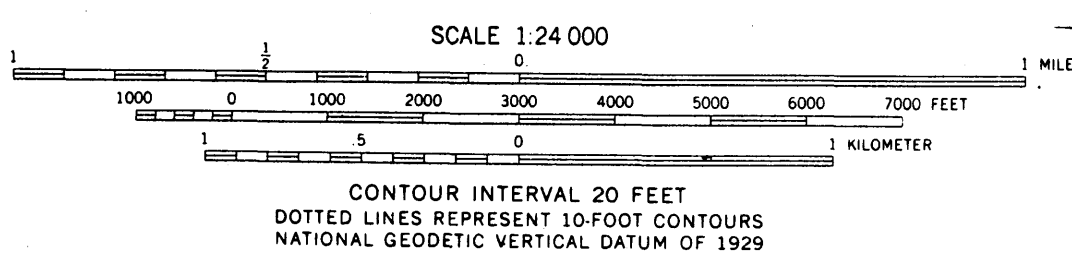
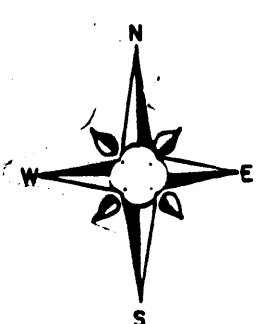
## QUADRANGLES

OKLAHOMA CITY, OKLAHOMA

BRITTON, OKLAHOMA

BETHANY, OKLAHOMA

MUSTANG, OKLAHOMA





**REFERENCE 1**

**RECEIVED**  
**SUPERFUND**

JUN - 4 1992

**RECORDS**  
**CENTER**

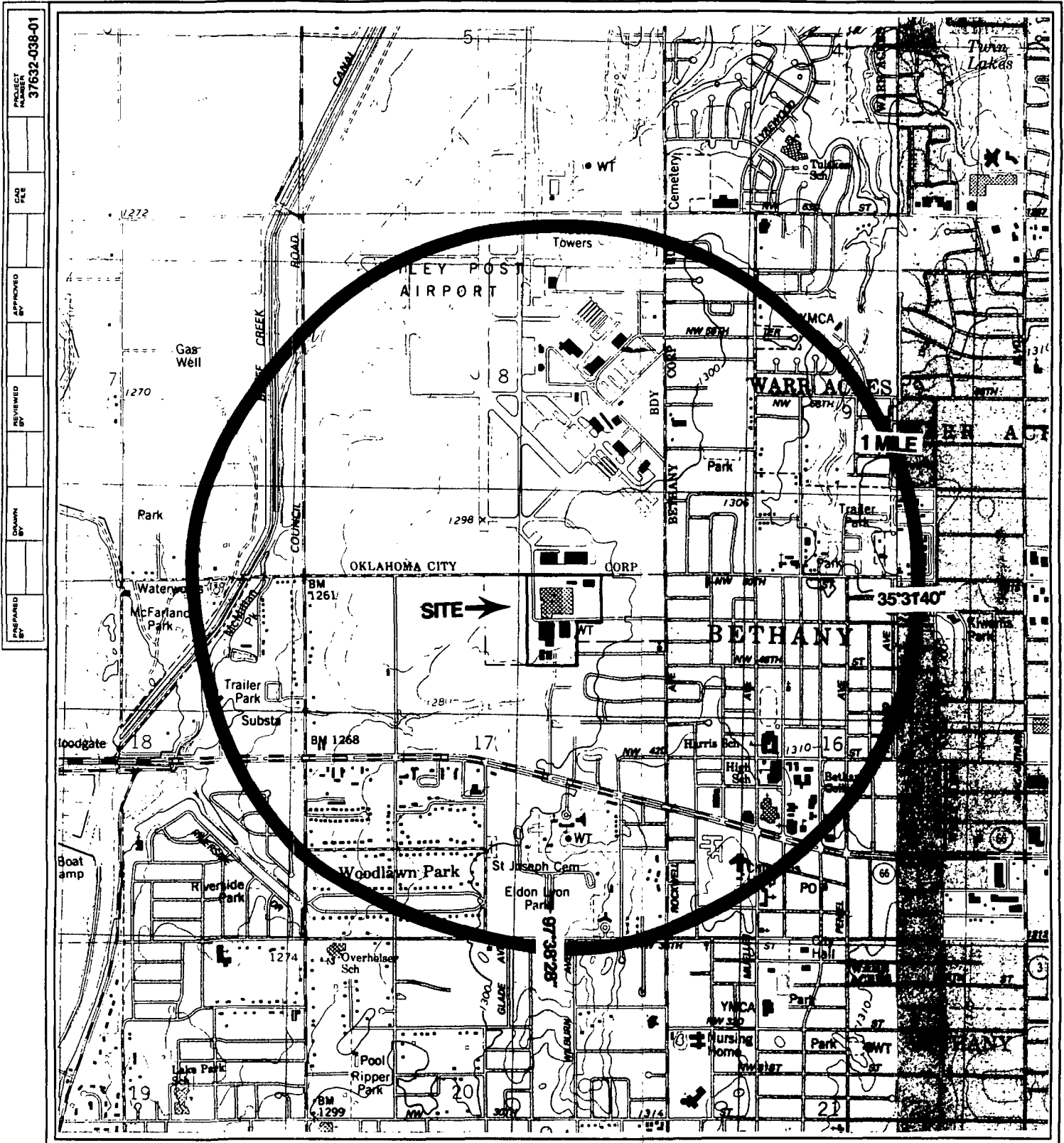
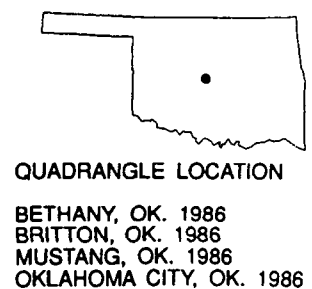
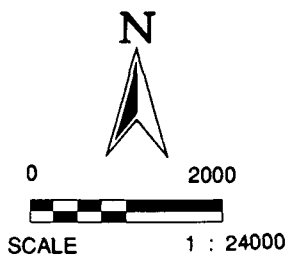


FIGURE 1

**SITE LOCATION MAP**

**GULFSTREAM AEROSPACE CORPORATION  
BETHANY, OKLAHOMA**

CERCLIS #OKD981518327



## **REFERENCE 2**

Disp. Plan No. 55109

Permit No. \_\_\_\_\_

EPA I.D. NO. OKT410010821

OKLAHOMA CONTROLLED INDUSTRIAL WASTE COMPLIANCE INSPECTION

SITE IDENTIFICATION

A. Site Name Culstream Aerospace Corp. B. Street (or other identifier) 5001 N Rockwell  
 C. City Bethany D. State OK E. Zip Code 73008 F. County Name Oklahoma

G. Site Operator Information Bill Humes Senior V.P. operator

1. Name Owner: Chrysler Corp. S. Telephone Number 405-789-5000  
 3. Street (Same) 4. City \_\_\_\_\_ 5. State \_\_\_\_\_ 6. Zip Code \_\_\_\_\_

H. Site Description Manufacture Aircraft Parts

J. Type of Ownership  
 \_\_\_ 1. Federal \_\_\_ 2. State \_\_\_ 3. County \_\_\_ 4. Municipal ☒ 5. Private

K. ☒ 1. Generator \_\_\_ 2. Transporter \_\_\_ 3. Treatment \_\_\_ 4. Storage \_\_\_ 5. Disposal

INSPECTION INFORMATION

A. Principal Inspector Information

1. Name Lynn Doty 2. Title Environmental Specialist  
 3. Organization OSDH 4. Telephone No. (area code & No.) 405-271-5338

B. Inspection Participants

Joe Reeves, Material + Process Engr., Culstream Aerospace Corp  
Barbara Mass, Personnel Coordinator, Culstream Aerospace Corp  
Gayla D. Williams, Records Clerk/Dispatcher, "

GENERATOR: HuffStream Aerozpa  
DATE: July 11, 1985

OKLAHOMA CONTROLLED INDUSTRIAL WASTE  
COMPLIANCE INSPECTION REPORT  
GENERATORS CHECKLIST

Note: On multiple part questions circle those not in compliance.

Section A EPA Identification Number.

Area of  
N/C

1. Does Generator have EPA ID Number. (Rule 1.2.4 IAW 262.12 - EPA ID Number) and approved Disposal Plan (Rule 3.1)?

☒ Yes ☐ No.

a. If yes, EPA ID Number OKT410010821

b. OSDH Disposal Plan Number 55109

☒ Yes ☐ No

Section B - Hazardous Waste Determination - (Rule 3.13 IAW 262.11)

1. Does generator generate hazardous waste(s) listed in Subpart D (Rule 2.1 IAW 261.30 - 261.33 - List of Hazardous Waste)?

☒ Yes ☐ No

2. Does generator generate solid waste(s) that exhibit hazardous characteristics: (Corrosivity, ignitability, reactivity, EP toxicity) (Rule 2.3 IAW 261.20 - 261.24 - Characteristics of Hazardous Waste)?

☒ Yes ☐ No

a. If yes, list wastes and quantities on attachment. (Include EPA Hazardous Waste Number and Oklahoma Waste Code and provide waste name and description)

b. Does generator determine characteristics by testing or by applying knowledge of processes? Both

- (1) If determined by testing, did generator use test methods in Part 261, Subpart C (or equivalent)?

☒ Yes ☐ No

- USPCs did testing for generator  
(2) If equivalent test methods used, attach copy of equivalent methods used.

3. Are there any other solid wastes deemed non-hazardous by generators? i.e. (process waste streams, collected matter from air pollution control equipment, water treatment sludge, etc.)

☐ Yes ☒ No

a. If yes, did generator determine non-hazardous characteristics by testing or knowledge of process?

- (1) If determined by testing, did generator use test methods in Part 261, Subpart C (or equivalent)?

NA  
☐ Yes ☐ No

Area of  
N/C

(2) If equivalent test methods are used, attach copy of equivalent methods used.

- b. List wastes and quantities deemed non-hazardous or processes from which non-hazardous wastes were produced. (Use narrative explanations sheet).

Section C - Manifest

1. Does generator ship hazardous waste off-site?  
(Subpart B - The Manifest)

☒ Yes ☐ No

- a. If no, do not fill out Section C and D.

- b. If yes, identify primary off-site facility(s). ~~Use narrative explanations sheet.~~ *USPCI Lone Mountain*

2. Has generator shipped hazardous waste off-site since November 19, 1980?

☒ Yes ☐ No

3. Is generator exempted from regulation because of:

Small quantity generator (Rule 2.2 IAW 261.55 -  
Special requirements)

☐ Yes ☒ No

or  
produces non-hazardous waste at this time  
(Rule 2.1 IAW 261.4 - Exclusions)?

☐ Yes ☒ No

4. If not exempted does generator use a manifest?  
(Act 1-2010)

☒ Yes ☐ No

- a. If yes, is manifest form approved by OSDH?  
(Act 1-2010)

☒ Yes ☐ No

(Check completed manifests at random. Indicate how many manifests were inspected, how many violations were noted and the type of violation).

5. Does all the following information appear on the manifest(s)? (Rule 4.3.1 IAW 262.20)

☒ Yes ☐ No

(Circle deficiencies)

- a. Manifest document number
- b. Generator's name
- c. Generator's EPA ID number
- d. Generator's State ID number (disposal plan number)
- e. Generator's address
- f. Generator's telephone number
- g. Generator's signature
- h. Date that waste was offered for shipment
- i. Transporter's name
- j. Transporter's EPA ID number
- k. Transporter's OK ID number

Area of  
N/C

- l. Transporter's telephone number.
- m. Secondary transporter information (if applicable)
- n. Disposal facility name
- o. Disposal facility EPA ID number
- p. Disposal facility address
- q. Facility's telephone number
- r. Alternate facility information (if any)
- s. D.O.T. description of waste(s)
- t. Total quantity of each hazardous waste by units of weight or volume, and the type and number of containers as loaded onto vehicle.
- u. EPA waste code (if applicable)
- w. OK waste code

6. (a) Did generator obtain handwritten signature and date of acceptance from initial transporter?

☒ Yes ☐ No

(b) Who signed and dated for transporter? (Rule 4.3.1)

Name Jarious

Title Truck driver

7. Does generator retain one copy of manifest signed by generator and transporter? (Rule 3.9)

☒ Yes ☐ No

8. Do returned copies of manifest include facility owner/operator signature and date of acceptance? (Rule 3.10)

☒ Yes ☐ No

9. If copy of manifest from facility was not returned within 45 days, did generator file an exception report? (Rule 3.10 et.seq.)

NA ☐ Yes ☐ No

(a) If yes, did it contain the following information

1) Legible copy of manifest

NA ☐ Yes ☐ No

AND

2) Cover letter explaining generator efforts to locate waste.

NA ☐ Yes ☐ No

10. Does (will) generator retain both copies of manifest for 3 years? (Rule 1.3.1.5.1)

☒ Yes ☐ No

Section D Pre-Transport Requirements

(THESE REQUIREMENTS APPLY ONLY TO CONTAINERS THAT ARE BEING OFFERED FOR SHIPMENT OFF-SITE)

1. Does generator package waste?

☒ Yes ☐ No

If no, skip the rest of Section D

If yes, complete the following questions

2. Does generator package waste in accordance with 49 CFR 173, 178, and 179? (DOT requirements)(Rule 3.16(a) IAW 262.30 - Packaging)

☒ Yes ☐ No



Area of  
N/C

3. Inspect containers to be shipped. (Rule 3.16(a))

a. Are containers to be shipped leaking or corroding or bulging?

\_\_\_ Yes ☒ No

b. Use narrative explanations sheet to describe containers and condition.

c. Is there evidence of heat generation from incompatible wastes in the containers?

\_\_\_ Yes ☒ No

4. Does the generator follow DOT labeling requirements before transport in accordance with 49 CFR 172? (Rule 3.16(c) IAW 262.31 labeling) *USPCI does*

☒ Yes \_\_\_ No

5. Does the generator mark each package before transport in accordance with 49 CFR 172? (Rule 3.16(c) IAW 262.32 - Marking)

☒ Yes \_\_\_ No

6. Is each container of 110 gallons or less marked with the following label before transport? (Rule 3.16(c) IAW 262.32 - Marking) *not all*

\_\_\_ Yes ☒ No

Label saying: HAZARDOUS WASTE - Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency

Generator's Name and Address \_\_\_\_\_

Manifest Document Number \_\_\_\_\_

7. If there are any vehicles present on site loading or unloading hazardous waste, inspect for presence of placards. Note this instance on narrative explanation sheet. (Rule 3.16(d) IAW 262.33)

*NA*

SECTION E - Accumulation Time  
(Rule 3.17 and 3.18 IAW 262.34 - Accumulation Time)

1. Is facility a permitted storage facility or does the facility have interim status?

\_\_\_ Yes ☒ No

2. If no:

a. Is hazardous waste shipped off-site within 90 days? *Have been accepted see narrative*

\_\_\_ Yes ☒ No

b. Are containers used to store waste?

☒ Yes \_\_\_ No

(1) Is the beginning date of accumulation time clearly indicated? (Rule 3.15b)

\_\_\_ Yes ☒ No

*3.15b*

Area of  
N/C

- c. (1) Does generator inspect containers for leakage or corrosion? (Rule 3.16(a) IAW 265.174 - Inspections) *Re-use product drums to ship waste, USPC provides inspections* ☐ Yes ☒ No
- d. (1) Does generator handle ignitable or reactive waste? ☒ Yes ☐ No
- (2) If yes, does generator locate containers holding ignitable or reactive waste at least 15 meters (50 feet) inside facility's property line? (Rule 3.16(a) IAW 265.176 - Special Requirements for Ignitable or Reactive Wastes) ☒ Yes ☐ No

NOTE: If generator accumulates waste on-site for less than 90 days, fill out Generator Only Supplemental Checklist.

3. Describe storage area. ~~Use photos and narrative explanation sheet.~~ *Concrete slab floor inside of storage building with special area roped off.*

Section F-Recordkeeping and Records

1. Is generator keeping the following reports? (Rule 1.2.1.5.1 & 3.12 IAW 262.41 - Recordkeeping)(Note: the following must be kept for a minimum of three (3) years.)

- a. Manifests and signed copies from designated facilities? ☒ Yes ☐ No
- b. Quarterly Reports (Rule 3.12, 3.7) ☒ Yes ☐ No
- c. Exception Reports (Rule 3.10) ☒ Yes ☐ No
- d. Test results where applicable. ☒ Yes ☐ No
- e. Biennial Reports for each odd number year (Rule 3.12) ☒ Yes ☐ No

2. Where are records kept (at facility or elsewhere)?

At facility office

3. Who is in charge of keeping the records?

Name Gayla Williams Title Records Clerk / Dispatcher

Section G. - Special Condition

1. Has generator received from or transported to a foreign source any hazardous waste? (Rule 3.11 IAW 262.50 - International Shipments)

☐ Yes ☒ No

Area of  
N/C

If yes,

- a. Has he filed a notice with the Director
- b. Is this waste manifested and signed by Foreign Consignee?
- c. If generator transported wastes out of the country has he received confirmation of delivered shipment?

NA  
Yes No  
Yes No  
Yes No

### **REFERENCE 3**

66-10031

CONTROLLED INDUSTRIAL WASTE  
GENERATOR'S LISTING

This is a listing of all Controlled Industrial Wastes reported to the Oklahoma State Department of Health, Industrial Waste Division as being generated and disposed of by the Business/Plant named below, as of the date specified. This is not a permit and does not constitute authorization of any particular disposal practice, method, or site.

Disposal Plan Number: 55109 amending plan approved: April 17, 1990

has been assigned, as of: December 18, 1990, EPA ID :OKT410010821

Business/Plant Name: GULFSTREAM AEROSPACE

Mailing Address: ; P.O. BOX 22500; OKLAHOMA CITY, OK 73123

Plant Address/Location: 7400 NW 50TH; BETHANY, OK 73123

Person in Charge of Facility: BILL M. HUMES

Facility Contact: BILL CLEMENTS

Phone No. 405-789-5000

STATE WASTE CODE	FEDERAL WASTE CODE	CHARACTERISTIC	DESCRIPTION	TRANS- PORTER	RECEIVING FACILITY
020111		CORROSIVE	ACID AND SLUDGE	2004 2010 3411	SD47002
020102		CORROSIVE	CHROMIC ACID	2004 2010 3411	SD47002
654103		SENSITIZER	DRIED PAINT WASTE	2004 2010 3411	SD47002
104110	F005	FLAMMABLE	MEK	2004 2010 3411	RR47001 RR72001 RR83017
104611		FLAMMABLE	STODDARD SOLVENT	2004 2010 3411	RR47001 RR72001 RR83017
164621		TOXIC	TRICHLOROTHYLENE	2004 2010 3411	SD47002 RR72001 RR83017

✓  
mailed 12-19-90  
mic

654100	SENSITIZER	PAINT WASTE SOLID	2004 3074 2010 3411	SD47002 RR73001 RR83017
104110	FLAMMABLE	PAINT SOLVENT WASTE	2004 3074 2010 3411	RR47001 RR73001 RR83017
604110	FLAMMABLE	LABPACK-FLAMMABLE	2004 2010 3411	SD47002
F019		CHROME & CAKE	3074 2010 3411	TX83100
F002		TRICHLORETHANE	3074 2010 3411	RR73001
D007 D008		PAINT BOOTH SLUDGE	2004 2010 3411	IW73035 RR83017

---

COMMENTS:

STATE REMARKS:  
WASTE  
CODE

104110 RECYCLE  
104611 RECYCLE  
104110 PAINT SOLVENT RECYCLED  
CHROME AND CAKE RECYCLED  
TRICHLORETHANE RECYCLED

12 waste streams for Disposal Plan Number: 55109

**REFERENCE 4**

0832700033



## Gulfstream Aerospace Corporation

Commander Division  
Internal Letter

Date: . June 2, 1986

No: .

TO: (Name, Organization, Internal Address)

· FILE

FROM: (Name, Organization, Internal Address, Phone)

· BARBARA MARRS

Subject: . Chemical Spill

On Thursday, May 22, 1986 at approximately 12:50 p.m. Joe Reeves, Sr. Materials/Process Engineer, contacted me to come out behind the Fabrication area because we had a chemical spill of Chromic Acid mixed with 30 gallons of Hydrofluoric Acid. Roger Patterson and L.D. Bishop were moving the 500 gallon acid tank out of the process area so it could be pumped out. The forks on the fork lift did not fit into the runners designed on the tank which caused the tank to jar and the plastic line on the bottom of the tank broke away causing the contents to spill. L.D. Bishop advised Roger to raise the tank and move it towards the dirt road by the west side of the Maintenance building. John Jones was notified and met L.D. & Roger at the dirt road and plugged the hole in the tank. Approximately 200-250 gallons of acid was lost by the time the leak was plugged. See attached map for route of acid spill.

After Joe Reeves and I reached the Maintenance Building, Maintenance was using a sump pump to empty the remaining acid into the storage tank. A dam was built to stop the run-off and 3½ bags of sodium bicarbonate was put on the spill.

At 1:00 p.m. I tried to call the Safety Department in Savannah. Bobby Tucker was in flight back to Savannah from OKC; Jim Johnson was in Long Beach; Larry Miles was gone and the secretary was going to find someone to call me back. Approximately 10 minutes later, Steve Hudson called me. He said he didn't know what to do but he would try to get hold of Jim Johnson at Long Beach. Approximately 20 minutes later Steve called me back and said Jim had already left Long Beach for the airport. He stated he didn't know what to do other than dig up the asphalt and concrete. I told him I would check further before doing that. I then called for Curt Hall at U.S. Pollution Control. He was not in and I talked with another gentleman there who informed me they don't handle emergency spills. I asked if he knew anyone else who could give me some information and he did not.



Page Two  
June 2, 1986

Finally, about 3:00 p.m. Joe Reeves reached the McKesson Chemical Company and we were told to put lime on all the areas involved to neutralize it and then flush through sewer lines. We located some slate lime at Dolese Company and Maintenance went to pick it up. Maintenance spread 800 lbs. of lime over the areas involved.

Friday morning, May 23, Jim Johnson called me from Savannah. He went over all the information and then asked that we measure the area involved. Sherman Dobbs, Aubrey Weeks and myself went out and measured all of the area involved and then I took a map and drew the areas and the measurements and rapifaxed it to Bobby Tucker.

At 1:00 p.m. Sherman Dobbs and I made a conference call to Bobby Tucker and Jim Johnson. After much conversation it was decided that we should take samples from Sites A,B,C, & D before digging and then dig about 6" and take another sample. We would mail the samples to Jim Johnson so he could do chrome testing. The dirt that we scraped off was put into 3 dumpsters and locked up in a facility building next to the barrell house. It was also decided that EPA would be notified of the spill and Jim Johnson called them.

Tuesday afternoon, Lynn Doty and an assistant came out from EPA and looked at the areas and took their own samples. We had rain over the weekend when they took their samples and we are waiting to get their results so we know how to dispose of dirt.

Jim Johnson called me Friday afternoon, May 30 with the results of his tests:

Site A	-	Before:	1,466 ppm*	After:	310 ppm
B	-	Before:	280 ppm	After:	31 ppm
C	-	Before:	824 ppm	After:	307 ppm
D	-	Before:	1,584 ppm	After:	9.6 ppm

\*ppm = parts per million

We should get the state's test results the end of this week and then we can dispose of the dirt and know what, if any, other actions will be necessary.

Page Three  
June 2, 1986

**Conclusions:**

- 1) Maintenance is working on forks to be adjusted to fit into the runners on the acid tank.
- 2) Jim Johnson is writing an Emergency Procedure for us to follow in case of any future chemical spills.
- 3) Savannah is sending us a list of chemicals that we should have on hand to neutralize Chromic Acid and other chemicals that we have on plant site.
- 4) 1,000 lbs. of Sodium Bicarbonate is being ordered and also some lime.

*Barbara J. Marrs*

Barbara J. Marrs  
Supervisor-Industrial Relations

BJM/kf

cc: Bill Humes  
Bill Ziegler  
Sherm Dobbs  
Joe Reeves  
Bobby Tucker - Savannah  
Jim Johnson - Savannah

L.D. Bishop was instructed by memo to pump out a 500 gallon tank (approximately) which contains chromic acid and hydrofluoric acid from the process area. While the tank was full, it was removed by hand from the process area to the south side of the hangar outside. The hangar doors were left 85 to 90% closed. Roger Patterson picked up the tank with the Caterpillar fork lift. The forks were approximately 2½' apart when the tank was raised because the forks do not fit into the runners designed on the tank for being lifted. The fork caught a small piece of steel on the bottom of the tank which caused the tank to jar, causing the plastic line on the bottom of the tank to break away from the tank allowing the contents to spill. L.D. then requested Roger to raise the tank further and head for the dirt road by the west side of the maintenance building. By this time, John Jones had been notified and met Roger and L.D. at the dirt road, at which time John had put on proper safety clothing and plugged the hole in the tank with a rag and wooden peg. L.D. then used a sump pump to empty the remaining amount of acid in the tank to a storage tank. Approximately 250 gallons of acid was lost enroute to the dirt road and by the time the tank was plugged.

## REFERENCE 5

SAMPLE NUMBER 133407  
DATE COLLECTED 05/27/86  
DATE RECEIVED 05/28/86  
DATE COMPLETED 06/18/86  
STATION  
COLLECTED BY LYNN DOTY

00000

OKLAHOMA STATE DEPARTMENT OF HEALTH  
STATE WATER QUALITY LABORATORY  
WATER ANALYSIS REPORT

RECEIVED

JUN 20 1986

DWAIN FARLEY, CHIEF  
WASTE MANAGEMENT SERVICE  
OSDH ROOM 803  
OKLAHOMA CITY

Waste Management Service

COPY

*Clean up soil  
in bins*

OK 73152

GENERAL PROJECTS

CONCENTRATION IN SAMPLE

PARAMETER	VALUE	UNIT	PARAMETER	VALUE	UNIT
FLUORIDE IN SEDIMENT	29.30	MG/KG	PH (LAB)	11.60	STD UNI
ARSENIC IN SEDIMENT <	3.00	MG/KG	BARIUM IN SEDIMENT	52.00	MG/KG
CADMIUM IN SEDIMENT	9.71	MG/KG	EP TOX CHROMIUM	26900	UG/L
CHROMIUM IN SEDIMENT	1281.00	MG/KG	LEAD IN SEDIMENT	156.00	MG/KG
EP TOX LEAD <	45	UG/L	MERCURY IN SEDIMENT <	0.05	MG/KG
SELENIUM IN SEDIMENT	4.63	MG/KG	SILVER IN SEDIMENT <	0.35	MG/KG

REMARK CODE EXPLANATIONS

< LESS THAN DETECTION LIMIT

SEE REVERSE SIDE FOR WATER QUALITY REPORT SIGNIFICANCE

SOURCE GULFSTREAM AEROSPACE SURFACE  
PROGRAM WASTE MGMT SER (GENERAL PROJ)  
COUNTY OKLAHOMA

CITY OKLAHOMA CITY

LEGAL

SAMPLERS CHROMIC AND HYDROFLUORIC ACIDS WERE SPILLED ON GROUND AND  
COMMENTS NEUTRALIZED WITH SLATE LIME

ANALYST'S  
COMMENTS

*No free liquid*

REQUISITIONER COPY

ANALYST

*Chiff Patten*



## **REFERENCE 6**

PLANT

DATE

Gulfstream Aerospace  
July 11, 1986

## GENERATOR ONLY SUPPLEMENTAL CHECKLIST

Use these pages for Generators which accumulate at least 1000 k.g.  
of waste in (1.) Tanks or (2.) Containers  
and Do Not Store Over 90 Days (Required by Rule 3.16)

In violation of 90 Day Storage Requirement

Area of  
N/C

Personnel Training

1. Does the owner/operator have a personnel training program that includes where applicable: (IAW 265.16 - Personnel Training)

See Narrative

a) Procedures for using, inspecting, repairing, and replacing facility emergency equipment.

✓ Yes     No

b) Key parameters for automatic waste feed cut-off systems.

N/A Yes     No

c) Procedures for using communications or alarm systems.

✓ Yes     No

d) Responses to fires or explosions.

✓ Yes     No

e) Responses to groundwater contamination incidents.

✓ Yes     No

f) Shutdown of operations.

✓ Yes     No

2. Is the training program directed by a person trained in hazardous waste management procedures? (IAW 265.16 - Personnel Training)

    Yes ✓ No

3. Does the owner/operator maintain Personnel Training records at the facility? (IAW 265.16--Personnel Training)

    Yes ✓ No

a) If yes, do they include:

1. Job title for each position related to controlled industrial waste management and the name of each employee filling a position?

N/A  
    Yes     No

2. Written job description for each job title including the requisite skill, education or other equivalent education and duties of personnel assigned to each position?

    Yes     No

3. Description of type and amount of both introductory and continuing training that will be given to each person filling a position.

    Yes     No

4. Records that document that the required training has been given to or completed by facility personnel?

✓ Yes     No



Area of  
N/C

☒ b) Do personnel take part in an annual review of the training required? ☐ Yes ☒ No

Section B - Preparedness and Prevention

☒ 1. Is there evidence of fire, explosion or contamination of the environment? (IAW 265.31 - Maintenance and operation of facility) ☒ Yes ☐ No

If yes, use narrative explanations sheet to explain.

2. Is the facility equipped with (IAW 265.32 - Required equipment)

\_\_\_\_\_ a) Internal communications or alarm system capable of providing immediate emergency instruction to facility personnel? (Voice or signal) ☒ Yes ☐ No

\_\_\_\_\_ b) Telephone or two-way radio (that is immediately available at the scene of operations) to call emergency response personnel? ☒ Yes ☐ No

\_\_\_\_\_ c) Portable fire extinguishers, fire control equipment, spill control equipment and decontamination equipment? ☒ Yes ☐ NO

\_\_\_\_\_ (1) Is this equipment tested to assure its proper operation? (IAW 265.33 - Testing and maintenance of equipment) ☒ Yes ☐ No

\_\_\_\_\_ d) Water of adequate volume for hoses, sprinklers or water spray system?

1. Describe source of water Onsite Storage Tank for Back-up to City of Bethany Water
2. Indicate flow rate and/or pressure and storage capacity if applicable. Acceptable  
Storage tank holds 210,000 gallons

\_\_\_\_\_ 3. Is there sufficient aisle space to allow unobstructed movement of personnel and equipment? (e.g. adequate aisle space in between barrels to check for leakage, corrosion and proper labeling, etc.) (265.35 - Required aisle space) ☒ Yes ☐ No

\_\_\_\_\_ 4. Has the owner/operator made arrangements with the local authorities to familiarize them with characteristics of the facility? (Layout of facility, properties of hazardous waste handled and associated hazards, places where facility personnel would normally be working, entrances to roads inside facility, possible evacuation routes) (IAW 265.37 - Arrangements with local authorities) Not written need to give a copy of contingency plan ☐ Yes ☒ No

\_\_\_\_\_ If no, has the owner/operator attempted to make such arrangements? Fire department has inspected the facility. Verbal discussions ☒ Yes ☐ No

Area of  
N/C

5. In the case that more than one police or fire department might respond, is there a designated primary authority? (IAW 265.37 - Arrangements with local authorities) ☒ Yes ☐ No

a) If yes, indicate primary authority Wile Post Airport Fire Dept.

b) Is the fire department a city or volunteer fire department? City

6. Does the owner/operator have phone numbers of and agreements with State emergency response teams, emergency response contractors and equipment suppliers? (IAW 265.37 - Arrangements with local authorities) ☒ Yes ☐ No

Are they readily available to the emergency coordinator? ☒ Yes ☐ No  
Benjamin Mann's Personnel Office/Police/Rel.

7. Has the owner/operator arranged to familiarize local hospitals with the properties of hazardous waste handled and types of injuries that could result from fires, explosions, or releases at the facility? ☒ Yes ☐ No

If no, has the owner/operator attempted to do this?

NA Yes ☐ No

8. If the State, or local authorities decline to enter into the above referenced agreements, has this situation been entered in the operating record? (IAW 265.37 - Arrangements with local authorities) ☒ Yes ☐ No

### Section C - Contingency Plan and Emergency Procedures

1. Does the facility have a contingency plan? (IAW 265.51 - Purpose and implementation of Contingency Plan) ☒ Yes ☐ No

a) If yes, is it maintained at the facility? (IAW 265.53 - Copies of Contingency Plan) ☒ Yes ☐ No

2. Is the contingency plan a revised SPCC Plan? (IAW 265.52 - Content of Contingency Plan)) ☐ Yes ☒ No

3. Does the contingency plan contain the following information: (IAW 265.52 - Content of Contingency Plan) ☒ Yes ☐ No

a) A description of the actions to be taken by facility personnel in the event of fire, explosion, or release of controlled industrial waste? ☒ Yes ☐ No

b) A description of the arrangements with local authorities? ☒ Yes ☐ No

Area of  
N/C

C) A list of names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinator?

\_\_\_\_ Yes ☒ No

d) A list of all emergency equipment including 1) the location of each item 2) a physical description of each item on the list and 3) an outline of each item's capabilities? Partial

\_\_\_\_ Yes ☒ No

e) An evacuation plan where there is a possibility that evacuation could be necessary including

\_\_\_\_ Yes ☒ No

1) signals to begin evacuation

2) evacuation routes

3) alternate evacuation routes

\_\_\_\_ 4. Is there an emergency coordinator on site or within short driving distance of the plant at all times? (IAW 265.55 - Emergency Coordinator)

☒ Yes \_\_\_\_ No

☒ 5. Has the facility supplied all local authorities and State response teams with a copy of the contingency plan? (IAW 265.53 - Copies of Contingency Plan)

\_\_\_\_ Yes ☒ No

\_\_\_\_ 6. Has the contingency plan ever been implemented? (IAW 265.56 - Emergency Procedures)

☒ Yes \_\_\_\_ No

a) If yes, was a written report submitted to the Director within 15 days after the incident?

NA Yes \_\_\_\_ No

GulfStream 7/11/86

## Generators Checklist Narrative

### Item

B.1 + B2 The types of wastes and quantities are attached to this checklist as photocopies of the biennial report, disposal plan and facility records. In addition to the attached lists of wastes the facility has contaminated soil to dispose of. On May 22, 1986 a spill of hydrofluoric and chromic acid was reported and the removed soil was sampled. The attached lab report shows this contaminated soil to be EP Toxic for Chromium. After soil removal the ground was sampled by compositing soil every fifty feet along the spill area. The ground sample data is also attached and shows an EP Toxic value for lead. It was discovered during sampling that lead contaminated foundry sand had been previously dumped on the ground. The lead contaminated area was colored a dark brown. The facility must initiate a clean-up program for the lead contaminated area. All lead and chromium contaminated soil must be disposed of as a hazardous waste. A memo to the files was written regarding the spill incident.

Gulfstream 7/11/86

Generators  
Checklist Narrative Cont

Item

D. 6+ Most of the Containers in the storage  
E. b. 1 area did not have the required labels  
identifying hazardous waste. Those containers  
which lacked labels also lacked the  
beginning date of accumulation time.

E. a The Facility is in the process of cleaning  
out old chemical products and as a result has  
accumulated a large amount of waste. USPCI  
packed and labelled the extra waste for shipping.  
The regular waste was not labelled and all  
of the Containers were stored for more than 90 days  
while cleanup progressed. The philosophy for exceeding  
the 90 day limit was to save money by shipping  
all generated waste at one time to cut transport  
cost. The date on labelled drums was March 6, 1986

Gulfstream 7/11/86

Generator Only  
Checklist Narrative

Item

- 1.0 The Contingency plan contains an outline for a personnel training program. This outline however
- 2.0 has not been implemented. A person trained in hazardous waste management procedures is not
- 3.0 directing a training program. As no training program is carried out there are no training records and annual reviews are non-existent.
- B.1 On May 22, 1986 Gulfstream reported a waste spill of hydrofluoric and chromic acid onto the ground. This soil was neutralized and removed to storage bins. Removed soil was EP toxic for Chromium. In situ soil showed lead contamination from foundry sand disposal which as yet has not been removed and is EP toxic. See narrative to generators Checklist item B.1 + B.2.
- C-3.C The Contingency plan does not spell out the names and addresses or phone numbers for the
- C.3.d emergency coordinators. More details are needed regarding the list of emergency equipment to include the locations of each item and the items
- C.3.e capabilities. Evacuation routes and alternate routes are not marked on the facility Contingency map. The map contains extraneous information and does not

Gulfstream 7/11/86

## Generators Only Narrative Cont

Item

depict the currently used waste storage areas. The text needs to include the storage tank which was added since the plan was written in 1982.

The text of the Contingency plan (page 3) states the storage area for containers is used for waste remaining an excess of 90 days. The sentence should read not in excess of 90 days. Appendix E of the Contingency plan has an inspection form for the container storage area but not one for inspecting the tank and safety and emergency equipment. Appendix I lists the agencies who are to receive incident reports; the Director of CSDH Industrial Waste Division was left off this list. Appendix G states amendments will be made to the Contingency plans 6 months after review, the regulations require that amendments be made immediately. This Contingency plan must be

C.5 updated. Local authorities have not been provided a copy of the Contingency plan - they must be provided an amended version as the existing plan is out of date.

FACILITY

DATE

Gulf Stream Aerospace  
7/11/86CONTAINERS STORAGE CHECKLIST  
(Rule 7.1.6 & 7.8)Area of  
N/C

1. Does the facility store hazardous waste in containers?  
(IAW 265.170) (Includes hoppers and gondolas)

☒ Yes ☐ No

If no, do not complete this form.

2. Are the containers in good condition?  
(check for leaks, corrosion, bulges, etc.)

☒ Yes ☐ No

3. If a container is found to be leaking, does the  
operator transfer the hazardous waste from the  
leaking container? (IAW 265.171)

☒ Yes ☐ No

4. Is the waste compatible with the containers and/or  
its liner? (IAW 265.172)

☒ Yes ☐ No

If no, explain in narrative.

5. Are the stored containers closed?

☒ Yes ☐ No

If no, explain in narrative.

6. Are containers holding hazardous waste opened,  
handled, or stored in such a manner as to cause  
the container to rupture or leak? (IAW 265.173)

☐ Yes ☒ No

If yes, explain in narrative.

7. Are areas where containers are stored inspected at least  
weekly looking for container leaks and for deterioration  
caused by corrosion or other factors? (IAW 265.173)

☐ Yes ☒ No

8. Are containers holding ignitable or reactive wastes  
located at least 15 meters (150 feet) from the facility  
property line? (IAW 265.176)

☒ Yes ☐ No

9. Are incompatible wastes stored in the same containers or  
placed in an unwashed container that previously contained  
an incompatible waste or material? (IAW 265.177)

☐ Yes ☒ No

If yes, explain in narrative.

10. Are containers holding incompatible wastes kept apart by  
physical barrier or sufficient distance? (IAW 265.177)

☒ Yes ☐ No

If no, explain in narrative.



Gulfstream 7-11-86

Containers  
Checklist Narrative

Item

7. The Container storage area is not inspected on a regular basis for signs of leaks or deterioration. The start of accumulation date has not been marked on each container.

FACILITY GulfstreamDATE: 7/11/86TANKS CHECKLIST  
(Rule 7.9 & 7.1.6.)Area of  
N/C

NOTE: If multiple tanks exist, list each tank and specify compliance or non-compliance. Complete an individual checklist for each tank not in compliance and collective checklist for those in compliance.

1. Are there any tanks which are not being used which the facility no longer plans to use?        YES ✓ NO

a. If yes, has all hazardous waste and hazardous waste residue been removed from these tanks, discharge control equipment, and discharge confinement structures? NA YES        NO

2. Are tanks presently used to treat or store waste? ✓ YES        NO

a. If no, do not complete rest of form.

b. If yes, check tanks.

3. Is there evidence that wastes placed in the tank are incompatible with the tank or liner? (IAW 265.192)        YES ✓ NO

NOTE: Any evidence of ruptures, leaks or corrosion. (Use narrative explanations sheet.)

4. Are there any uncovered tanks? (IAW 265.192)        YES ✓ NO

a. If no, do not complete 4b. -e.

b. If yes, do they have 2 feet (60cm) freeboard?

NA YES        NO

OR

c. A containment structure? (e.g. dike or trench)

       YES        NO

OR

d. A drainage control system?

       YES        NO

OR

e. A diversion structure? (e.g. standby tank)

✓ YES        NO

(NOTE: The structure in c, d or e must have a capacity that equals or exceeds the volume of the to 2 feet (60 cm) of the tank.

If the answers to 4b. -e. are "no", explain current conditions using narrative sheets.

Area of  
N/C

5. Are any of the tanks continuous feed? (IAW 265.192)

\_\_\_ YES ☒ NO

a. If yes, is it equipped with a means to stop inflow (e.g. waste feed cutoff or by-pass to a stand-by tank)?

NA YES \_\_\_ NO

Waste Analysis

6. Is the tank used to store one waste exclusively?

\_\_\_ YES ☒ NO

(Use narrative explanations sheet). *variety of acid wastes*

1. Are waste analyses and trail tests conducted on these wastes

\_\_\_ YES ☒ NO

OR

Does the owner/operator have written documented information on similar treatment of similar wastes under similar operating conditions? *Experience*

\_\_\_ YES ☒ NO

2. Is this information retained in the operating record?

\_\_\_ YES ☒ NO

Inspections (Note: This section does not exclude underground tanks)

7. Does the owner/operator inspect the following at least daily, where present? (IAW 265.194)

NA YES \_\_\_ NO

(Indicate which items are present in 7 and 8.)

a. Discharge control equipment (e.g. waste feed cut-off, by pass and/or drainage systems)?

NA YES \_\_\_ NO

b. Monitoring equipment (e.g. pressure and temperature gages)?

NA YES \_\_\_ NO

c. Level of waste in each uncovered tank?

NA YES \_\_\_ NO

8. Does the owner/operator inspect the following at least weekly? (IAW 265.194)

\_\_\_ YES ☒ NO

a. Construction materials of tanks for corrosion or leaks?

☒ YES \_\_\_ NO

b. Construction materials of and area surrounding discharge confinement structures for erosion or signs of leakage?

☒ YES \_\_\_ NO

9. What is the procedure for assessing the condition of the tank(s)?

Explain in narrative. (e.g. How does the procedure allow for detection of cracks, leaks or corrosion or procedures for emptying the tank to allow entrance, etc.)

*Obscure for Rust, leaks, Seepage  
Visual Observations by maintenance Dept*

10. Does the facility have a closure plan? (IAW 265.197)

☒ YES ☒ NO

a. Does the plan address the closure of each tank?  
If no, explain in narrative.

☒ YES ☒ NO

b. Is the plan maintained at the facility

☒ YES ☒ NO

11. Are ignitable or reactive wastes placed in tanks?  
(IAW 265.198)

☐ YES ☒ NO

a. If yes, are they treated, rendered or mixed before or immediately after placement in the tank so it no longer meets the definition of ignitable or reactive?

☒ YES ☐ NO

OR

b. Is the waste protected from sources of ignition or reaction?

☒ YES ☐ NO

1. If yes, use narrative explanations sheet to describe separation and confinement procedures.

*by isolation & segregation*

2. If no, use narrative explanations sheet to describe sources of ignition or reaction

OR

c. Is the tank used solely for emergencies?

☐ YES ☒ NO

12. Has the facility ever placed incompatible wastes in the tank? (IAW 265.199)

☐ YES ☒ NO

a. If yes, what were the results. (Use narrative explanations sheet). (Look for signs of mixing of incompatible wastes, e.g. fire, toxic mist, heat generation, bulging containers, etc.

13. If a waste is to be placed in a tank that previously held an incompatible waste, was that tank washed? (IAW 265.199)

☒ YES ☐ NO

a. If Yes, describe washing procedures (Use narrative explanation sheet).

b. Describe how it is possible for incompatible wastes to be placed in the same tank. (Use narrative explanations sheet.)

GulfStream 7/11/86

## Tanks Checklist Narrative

### Item

6.0 GulfStream utilizes one storage tank for mixed acid waste. The tank holds approximately 5,000 gallons. Wastes stored in this tank include HCl, HF,  $H_2SO_4$  and Chromic acids. The wastes are said to be hauled offsite to U.S.P.C.I. every 60-70 days however the start of accumulation date is not recorded.

6.1 Based on experience the operator has determined the wastes in the tank to be compatible. Testing is not necessary.

8.0 The operator stated that the tanks are inspected however no frequency is determined as inspection schedules and logs are not being maintained for the tank.

9.0 The maintenance department personnel are responsible for visually observing the tank for signs of Rust, leaks, seepage etc. The tank appears to be in good condition.

10.a The facilities closure plan dated September 1982 does not address the closure of the tank.

11.b The tank is protected from sources of ignition or reaction by its placement on the property; isolated from such sources.

This checklist was filled out because the Generator was in violation of the 90 day Storage Limitation.

FACILITY Gulfstream  
DATE: 7-11-86

OKLAHOMA CONTROLLED INDUSTRIAL WASTE COMPLIANCE

INSPECTION REPORT - FACILITIES CHECKLIST

Area of

N/C Section A - General Facility Standards

\_\_\_\_ 1. Does facility have EPA Identification No. and OSDH Site No? \_\_\_\_\_ YES ☒ NO  
(Rule 7.1.6 IAW 40 CFR, 265.11)

\_\_\_\_ A. If yes, OSDH Site No. \_\_\_\_\_

\_\_\_\_ EPA I.D. NO. OKI410010821

If no, explain This facility notified as Generator Only - therefore was not given a site number

\_\_\_\_ 2. Has facility received hazardous waste from a foreign source? \_\_\_\_\_ YES ☒ NO  
(Rule 7.1.6 IAW 40 CFR 265.12)

\_\_\_\_ A. If yes, has he filed a notice with the Director? NA YES \_\_\_\_\_ NO

\_\_\_\_ 3. Does owner/operator control precipitation, run on and runoff that is or may become contaminated with industrial waste? ☒ YES \_\_\_\_\_ NO  
(Rule 7.2.2)

\_\_\_\_ A. Explain Berm around Storage tank, Containers stored inside building

\_\_\_\_ B. Is a containment structure used? Designed for less than 90 day storage NA YES \_\_\_\_\_ NO

\_\_\_\_ 1. Is the structure capable of retaining precipitation and runoff generated by 24 hr., hundred year storm plus a minimum of two (2) feet of freeboard. (Rule 7.2.2.2) NA YES \_\_\_\_\_ NO

\_\_\_\_ 4. Is all material handling conducted with in dikes, retention walls or other features to control all spills? Explain. NA YES \_\_\_\_\_ NO  
(Rule 7.2.3)

\_\_\_\_ A. Will the system contain the larger of

i. Volume of largest truck or rail cars loaded or unloaded

or

ii. 20% maximum total volume of all trucks and rail cars being loaded or unloaded at one time

plus

Precipitation and runoff generated by the 24Hr/50 year storm

plus

a minimum 12 in. of freeboard

~~15~~

Area of  
N/C

7/11/86

5. Are all contained liquids handled as a controlled industrial waste? (Rule 7.2.3.1)

Explain Should a tank, container, etc leak it is handled as CIW

☒ YES ☐ NO

Waste Analysis

6. Does facility maintain a copy of the waste analysis plan at the facility (Rule 7.1.6, IAW 40 CFR 265.13)

☐ YES ☒ NO

A. If yes, does it include

NA

1. Parameters for which each waste will be analyzed?

☐ YES ☐ NO

2. Test methods used to test for these parameters?

☐ YES ☐ NO

3. Sampling method used to obtain sample?

☐ YES ☐ NO

4. Frequency with which the initial analyses will be reviewed or repeated?  
(For facilities receiving waste from off-site)

☐ YES ☐ NO

5. Waste analyses that generators have agreed to supply?  
(For facilities receiving waste from off-site)

☐ YES ☐ NO

6. Procedures which are used to inspect and analyze each movement of hazardous waste including:

a. Procedures to be used to determine the identity of each movement of waste?

☐ YES ☐ NO

b. Sampling method to be used to obtain representative sample of the waste to be identified?

☒ YES ☐ NO

7. Does the facility provide adequate security through:  
(Rule 7.3.1)

A. Fence around facility? (Rule 7.3.1)

☒ YES ☐ NO

B. Locked entrance? (Rule 7.3.1)

☒ YES ☐ NO

C. Warning sign? (Rule 7.4.1)

☐ YES ☒ NO

General Inspection Requirements

8. A. Does the owner/operator maintain a written schedule for inspecting: (Rule 7.1.6 IAW 265.15 - General Inspection Requirements)

1. Monitoring equipment? (If applicable)

NA ☐ YES ☐ NO

Area of  
N/C

- \_\_\_\_ 2. Safety and emergency equipment? \_\_\_\_\_ YES ☒ NO
- \_\_\_\_ 3. Security devices? \_\_\_\_\_ YES ☒ NO
- \_\_\_\_ 4. Operating and structural equipment (if applicable) NA YES \_\_\_\_\_ NO
- \_\_\_\_ 5. Does the schedule or plan identify the types of problems to be looked for during inspection? \_\_\_\_\_ YES ☒ NO
- \_\_\_\_ a. Malfunction or deterioration (e.g. inoperative sump pump, leaking fitting, eroding dike, corroded piper or tanks, etc.) \_\_\_\_\_ YES ☒ NO
- \_\_\_\_ b. Operator error \_\_\_\_\_ YES ☒ NO
- \_\_\_\_ c. Discharges (e.g. leaks from valves or pipes joint breaks, etc.) \_\_\_\_\_ YES ☒ NO
- \_\_\_\_ B. Is a written schedule for these inspections maintained at the facility? \_\_\_\_\_ YES ☒ NO
- \_\_\_\_ 1. Are these inspections conducted? \_\_\_\_\_ YES ☒ NO
- \_\_\_\_ a. Is a record of these inspections maintained in the inspection log? \_\_\_\_\_ YES ☒ NO
- ☒ 9. Does the owner/operator have an inspection log? (Rule 7.1.6 IAW 265.15 - General Inspection Requirements) \_\_\_\_\_ YES ☒ NO
- \_\_\_\_ A. If yes, does it include:
- \_\_\_\_ 1. Date and time of inspection? NA YES \_\_\_\_\_ NO
- \_\_\_\_ 2. Name of inspector? \_\_\_\_\_ YES \_\_\_\_\_ NO
- \_\_\_\_ 3. Notation of observations? \_\_\_\_\_ YES \_\_\_\_\_ NO
- \_\_\_\_ 4. Date and nature of repairs or remedial action? \_\_\_\_\_ YES \_\_\_\_\_ NO
- \_\_\_\_ B. Are there any malfunctions or other deficiencies noted in the inspection log that remain uncorrected? (Use narrative explanation sheet). \_\_\_\_\_ YES \_\_\_\_\_ NO
- \_\_\_\_ C. Are records of the inspection log maintained at the facility for three (3) years? ☒ YES \_\_\_\_\_ NO

Personnel Training *see generator Only Checklist*

- ☒ 10. Does the owner/operator maintain Personnel Training Records at the facility? (Rule 7.1.6 IAW 40 CFR 265.16) \_\_\_\_\_ YES ☒ NO

How long are they kept? \_\_\_\_\_

A. If yes, do they include: \_\_\_\_\_



Area of  
N/C

- \_\_\_\_\_ 1. Job title and written job description of each position? NA  
\_\_\_\_ YES \_\_\_\_ NO
- \_\_\_\_\_ 2. Description of type and amount of training? \_\_\_\_ YES \_\_\_\_ NO
- \_\_\_\_\_ 3. Records of training given to facility personnel? \_\_\_\_ YES \_\_\_\_ NO
- \_\_\_\_\_ 4. Is training reviewed annually? \_\_\_\_ ~~YES~~ \_\_\_\_ NO

Requirements for Ignitable, Reactive or Incompatible Waste

- \_\_\_\_\_ 11. Does facility handle ignitable or reactive wastes?  
(Rule 7.1.6 IAW 40 CFR 265.17) ✓ YES \_\_\_\_ NO

\_\_\_\_\_ A. If yes, is waste separated and confined from sources of ignition or reaction, (open flames, smoking, cutting and welding, hot surfaces, frictional heat) sparks (static, electrical or mechanical), spontaneous ignition (e.g. from heat producing chemical reactions) and radiant heat? ✓ YES \_\_\_\_ NO

- \_\_\_\_\_ 1. If yes, ~~use narrative explanations sheet to describe separation and confinement procedures.~~  
*No Smoking Area + Segregated from Ignition Sources*
- \_\_\_\_\_ 2. If no, use narrative explanation sheet to describe sources of ignition or reaction.

\_\_\_\_\_ B. Are smoking and open flame confined to specifically designated locations? ✓ YES \_\_\_\_ NO

\_\_\_\_\_ C. Are "No Smoking" signs posted in hazardous areas? ✓ YES \_\_\_\_ NO

\_\_\_\_\_ 12 Check Containers  
(Rule 7.8 & 7.1.6, IAW 40 CFR 265.17)

\_\_\_\_\_ A. Are containers leaking or corroding? \_\_\_\_ YES \_\_\_\_ ✓ NO

\_\_\_\_\_ B. Is there evidence of heat generation from incompatible wastes? \_\_\_\_ YES \_\_\_\_ ✓ NO

Section B - Preparedness and Prevention

- ✓ ① 1. Is there evidence of fire, explosion or contamination of the environment? (Rule 7.1.6 IAW 40 CFR 265.31) ✓ YES \_\_\_\_ NO

\_\_\_\_\_ 2. If yes, use narrative explanations sheet to explain.: *See Generator Only Narrative Section B.1*  
(Rule 7.1.6 IAW 40 CFR 265.32)

\_\_\_\_\_ A. Internal communication or alarm system? ✓ YES \_\_\_\_ NO

\_\_\_\_\_ (1) Is it easily accessible in case of emergency? ✓ YES \_\_\_\_ NO

Area of  
N/C

\_\_\_\_ B. Telephone or two-way radio to call emergency response personnel? ☒ YES \_\_\_\_ NO

\_\_\_\_ C. Portable fire extinguishers, fire control equipment, spill control equipment and decontamination equipment? ☒ YES \_\_\_\_ NO

\_\_\_\_ (1) Is this equipment tested to assure its proper operation? ☒ YES \_\_\_\_ NO

\_\_\_\_ D. Water of adequate volume for hoses, sprinklers or water spray system? ☒ YES \_\_\_\_ NO

(1) Describe source of water

City Supply

\_\_\_\_ 3. Is there sufficient aisle space to allow unobstructed movement of personnel and equipment? (Rule 7.1.6, IAW 40 CFR 265.35) ☒ YES \_\_\_\_ NO

☒ 4. Has the owner/operator made arrangements with the local authorities to familiarize them with characteristics of the facility? (layout of facility, properties of hazardous waste handled and associated hazards, places where facility personnel would normally be working, entrances to roads inside facility, possible evacuation routes). (Rule 7.1.6 IAW 40 CFR 265.37) ☒ YES ☒ NO  
Need to provide Contingency Plan has made verbal contact only

\_\_\_\_ 5. In the case that more than one police and fire department might respond, is there a designated primary authority? (Rule 7.1.6, IAW 40 CFR 265.37) ☒ YES \_\_\_\_ NO

a. If yes, list primary authority

Fire = Wiley Post Airport  
Police = City of Bethany

\_\_\_\_ 6. Does the owner/operator have phone numbers of, and agreements with, State emergency response teams, emergency response contractors and equipment suppliers? (Rule 7.1.6, IAW 40 CFR 265.37) ☒ YES \_\_\_\_ NO

\_\_\_\_ Are they readily available to emergency coordinator? ☒ YES \_\_\_\_ NO

\_\_\_\_ 7. Has the owner/operator arranged to familiarize local hospitals with the properties of hazardous waste handled and types of injuries that could result from fires, explosions, or releases at the facility? (Rule 7.1.6, IAW 40 CFR 265.37) ☒ YES \_\_\_\_ NO

Section C - Contingency Plan and Emergency Procedures

(See Generator Only Narrative Section C)

\_\_\_\_ 1. Is a contingency plan maintained at the facility? (Rule 7.1.6, IAW 40 CFR 265.51 & 53) ☒ YES \_\_\_\_ NO

\_\_\_\_ A. 1. If yes, is it a revised SPCC Plan? (Rule 7.1.6, IAW 40 CFR 265.52) \_\_\_\_ YES ☒ NO

Area of  
N/C

- \_\_\_\_ 2. Actions to be taken in response to emergencies? ✓ YES \_\_\_\_ NO
- \_\_\_\_ 3. Description of arrangements with police, fire and hospital officials? ✓ YES \_\_\_\_ NO
- ✓ 4. List of names, addresses, phone numbers of persons qualified to act as emergency coordinator? \_\_\_\_ YES ✓ NO
- ✓ 5. List of all emergency equipment at the facility? \_\_\_\_ YES ✓ NO
- ✓ 6. Evacuation plan for facility personnel? \_\_\_\_ YES ✓ NO
- \_\_\_\_ 2. Is there a emergency coordinator on site, or within short driving distance, at all times?  
(Rule 7.1.6, IAW 40 CFR 265.55) ✓ YES \_\_\_\_ NO

Section D - Manifest System, Recordkeeping and Reporting

1. Does facility receive waste from off-site?  
(Rule 1.3.1.6) \_\_\_\_ YES ✓ NO
- \_\_\_\_ A. If yes, does the owner/operator retain copies of all manifests?
- (1) Are the manifests signed and dated and returned to generator? NA YES \_\_\_\_ NO
- (2) Is a signed copy given to the transporter? NA YES \_\_\_\_ NO
- ✓ 2. Does the owner/operator keep a written operating record at the facility? (Rule 7.1.6 IAW 265.73) \_\_\_\_ YES ✓ NO
- \_\_\_\_ A. If yes, does it include:
- \_\_\_\_ (1) Description and quantity of each hazardous waste received? NA YES \_\_\_\_ NO
- \_\_\_\_ (2) Location and quantity of each hazardous waste at each location? \_\_\_\_ YES \_\_\_\_ NO
- \_\_\_\_ (3) Records and results of waste analyses? \_\_\_\_ YES \_\_\_\_ NO
- \_\_\_\_ (4) Report of incidents involving implementing of the contingency plan? \_\_\_\_ YES \_\_\_\_ NO
- \_\_\_\_ (5) Records and results of required inspections? ✓ YES \_\_\_\_ NO
- \_\_\_\_ (6) Monitoring, testing or analytical data? ✓ YES \_\_\_\_ NO

*done*

Area of  
N/C

- \_\_\_\_ (7) Closure cost estimates and for disposal facilities  
post closure cost estimates? NA YES \_\_\_\_ NO
- \_\_\_\_ (8) Is location of waste recorded on map or diagram? NA YES \_\_\_\_ NO
- \_\_\_\_ 3. Has the facility received any waste (that does not come under  
the small generator exclusion) not accompanied by a manifest? NA YES \_\_\_\_ NO
- \_\_\_\_ A. If yes, has he submitted an unmanifested waste report  
to the Director (Rule 7.1.6, IAW 265.76) YES \_\_\_\_ NO
- \_\_\_\_ 4. Has the facility received any shipments of controlled  
industrial waste which were inconsistent with the manifest?  
(Rule 7.1.6 IAW, 265.72) YES \_\_\_\_ NO
- \_\_\_\_ A. If yes, has he resolved the discrepancy with generator &  
transporter? YES \_\_\_\_ NO
- \_\_\_\_ B. If no, has a manifest discrepancy report been filed with  
the Director? YES \_\_\_\_ NO

Section E. - Plans and Reports

- \_\_\_\_ 1. Have all plans and reports been visually inspected and/or  
been made available for inspection? (Rule 7.1.6 IAW 265.74-  
availability, retention and disposition of records) ☒ YES \_\_\_\_ NO
- \_\_\_\_ A. Does the facility submit monthly reports to the Director?  
List discrepancies or errors As Generator submits quarterly reports YES ☒ NO
- \_\_\_\_ B. Does the facility submit annual reports that include closure cost  
estimates and, where applicable, monitoring data.  
List discrepancies or errors Closure cost est. not revised annually YES ☒ NO

\_\_\_\_ List plans and/or reports not made available for inspection.

Personnel Training Records

- \_\_\_\_ 2. Did operator provide inspector with a drawing of the facility? ☒ YES \_\_\_\_ NO
- \_\_\_\_ a. If yes, please indicate which are hazardous waste  
facilities on the drawing. Attachment
- \_\_\_\_ 3. Indicate types of hazardous waste facilities.

- ☒ Containers  
☒ Tanks  
\_\_\_\_ Surface Impoundments

APR

21

Area of  
N/C

- ☐ Waste Piles
- ☐ Land Treatment
- ☐ Landfill
- ☐ Incinerator
- ☐ Thermal Treatment
- ☐ Chemical, Physical and Biological Treatment

Section F - Groundwater Monitoring

1. Are there any ground water monitoring wells?  
(Rule 7.1.6 , 265.90 Applicability)

YES ☒ NO

- a. Is owner/operator aware that prior to 11/19/81  
he must install, operate and maintain a groundwater  
monitoring system (unless waived in writing)?

NA  
YES ☐ NO

The owner or operator of a surface impoundment, landfill, or land treatment facility which is used to management hazardous waste must implement a ground-water monitoring program. (Rule 7.1.6, IAW 265.90)

1. Specify the site(s) for which a ground water monitoring system (has) or  
(should have) been installed:

2. What date was the monitoring program initiated  
(date of first sampling)?

3. Indicate by a map or sketch locations of each monitoring well and distance  
from active site(s) (attach). Also list depths diameter and completion  
data on each well (or include well drilling and completion report).  
Indicate whether the wells are hydraulically upgradient or downgradient  
and the direction of flow of the groundwater. (Rule 7.1.6 IAW 265.91)

4. If no ground water monitoring system has been installed, include a copy  
of Low Potential Ground Water Demonstration used to document a low  
potential for migration of hazardous waste or constituents. Also des-  
cribe briefly what basis was used to justify the waiver of monitoring  
requirements: (Rule 7.1.6 IAW 265.190 (c))

5. If a ground water monitoring system has been installed, attach a copy of  
the ground water sampling and analysis plan. Briefly describe sample  
collection technique for obtaining samples and the method used to estab-  
lish elevation of ground water for ground water monitoring wells:  
(Rule 7.1.6 IAW 265.92)

Gulfstream 7/11/86

Facilities  
Checklist Narrative

Item

This Checklist was filled <sup>out</sup> because the 90 day storage time limitation was exceeded by the generator. The facility was not listed as a TSD and only notified as a generator.

+6.0 The facility does not utilize a waste analysis plan. This is required for TSD facilities.

+7.C The warning signs for TSD facilities are non-existent.

+8.0 The facility does not maintain an inspection schedule and does not perform routine inspections.

+9.0 No inspection logs are utilized or records kept.

+10.0 There are no personnel training records.

B4.C/C See generator only narrative the contingency plan is incomplete and copies have not been revised and provided to local authorities.

D2.0 As required for TSD facilities Gulfstream does not keep a written operating record at the facility.

G.2.A There is a closure plan but it does not address the tank at all or decontamination steps. Page 3 of the closure plan states that the Southern storage area may have waste stored in excess of 90 days this should be recorded to not in excess of 90 days. The Closure Plan and Contingency plan were written for Gulfstream.

Gulfstream 7/11/86

## Facilities Checklist Narrative Cont

by Stanley/Wynne Engineering in 1982. Both plans are inadequate and have been ignored by facility personnel in that their existence was not known to key personnel and filed away rather than actively updated and followed.

H. Gulfstream has not met the financial requirements of a TSD. There is a closure cost estimate but it does not address tank closure and has not been revised annually.

Area of  
N/C

6. Is a Ground Water Quality Assessment Plan maintained at the facility?

YES ☐ NO ☐ Outline only \_\_\_\_\_

7. Indicate the name and address of the facility conducting the analyses.

Section G - Closure and Post Closure (Rule 7.1.6)

1. Attach copy of closure plan. *See Bound Copy #82*

2. Does owner/operator maintain copy of closure plan at facility? ☒ YES ☐ NO  
(IAW 265.112)

If yes;

✓ (A.) Does Closure Plan Include: *Closure plan does not address Tank Storage Area only containers*

1. Description of steps to close facility.	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
2. Estimate of maximum inventory of wastes at facility	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
3. List steps needed to decontaminate equipment.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
4. Expected year of closure and schedule of closure.	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO

B. Does Post Closure Plan provide for thirty (30) years.  
(IAW 265.117)

1. Monitoring Activities.	<input type="checkbox"/> YES	<input type="checkbox"/> NO
2. Maintenance of monitoring and containment systems.	<input type="checkbox"/> YES	<input type="checkbox"/> NO
3. Has land authority been notified of waste disposal? (IAW 265.119)	<input type="checkbox"/> YES	<input type="checkbox"/> NO
4. Does deed contain notice that property was used for waste disposal? (IAW 265.120)	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO

✓ Section H - Financial Requirements (Rule 7.1.9)

1. List instrument of financial responsibility.

2. Is there a cost estimate for closure? (IAW 265.142)

3. Is there financial assurance for closure? (IAW 265.143)

4. Is there a cost estimate for post-closure? (IAW 265.144)

*NA if Generator only*

<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
<input checked="" type="checkbox"/> YES	<input checked="" type="checkbox"/> NO



## HAZARDOUS WASTE AND MATERIAL STORAGE:

**DEFINITION OF HAZARDOUS WASTE** - For the purposes of this plan, hazardous waste is defined as solid or liquid waste which, because of quantity, concentration, physical, or chemical characteristics, may pose a substantial present or potential hazard to the public or environmental health.

**STORAGE ACTIVITIES** - Hazardous waste that remains on site in excess of 90 days as defined in 40 CFR 265, are located in a single designated area. Wastes are stored in 55 gallon drums on a bermed concrete floor. See Appendix A for site plan drawing.

**DESCRIPTION** - The hazardous waste storage area is approximately 750 square feet in size. It is located at the southern end of the plant for the purpose of storing a variety of hazardous waste awaiting disposal or reclamation.

**DEFINITION OF HAZARDOUS MATERIALS** - For the purposes of this plan, hazardous materials will be defined as any material that, if discarded, would be defined as a hazardous waste.

**BARREL HOUSE** - A large amount of the chemicals used in the manufacturing process are stored in 55 gallon drums in the 20 X 40 back section of the flammable storage area. Approximately 3,500 gallons of a variety of chemicals are stored year around. These chemicals include trichlorethylene, methyl ethyl ketone, liquid smut, de-oxidizer, lubricants, and other chemicals. For further barrel house information, see Appendix B.

**PAINT STORAGE AREA** - The paint area is a 40 X 40 area that shares a common wall with the barrel house operation. Stored are large quantities of paint thinner, paints, primer, battery acid, styrene, toluene, sodium, silicate, and rubber cement. For detailed information, see Appendix B.

**HAZARDOUS WASTE AND MATERIAL SPILL CONTROL** - Major spill potential for hazardous waste storage area, barrel house, and the paint storage areas are limited since most storage is in 55 gallon drums or smaller containers. Small spills will be removed with an absorbant broom and disposed of properly. Large spills will be removed with the plant's mobil vacuum unit and will also be disposed of in an appropriate manner. In both cases, residue remaining on the floor will be retrieved using an absorbant material. Shovels will be used to place residue in plastic bags which will be sealed and retained for proper disposal.

## HAZARDOUS MATERIAL USAGE:

GENERAL - Chemical usage throughout the factory in various operations results in the generation of waste chemicals, and due to the quantities on hand in the facility posses a potential for hazardous waste spills.

**PROCESS AREA** - The process area consists mainly of a number of dip tanks for treating small airplant parts prior to apinting. Metal parts are dipped into hydro-fluoric acid, alkaline cleaner, sodium bi-cromate, cromate, nitric acid, an acidic deoxidizer, desmuter, cromic acid, and cadmium plating. For an inventory of process chemicals, see Appendix B. Approximately 12,000 gallons are stored in tanks of different sizes.

**Spill Control** - The largest potential for spills in this area would be rupturing of storage tanks. Any spills in the process area would be held by large open containment basins in the floor surrounding the tanks. These basins would be vacuumed to remove spilled material and remaining residue would be removed with an absorbant drying material. All spilled chemicals would be properly disposed.

**TOOLING AREA** - Outside the tooling area, a variety of chemicals are stored and used on a bermed concrete pad. These chemicals include petroleum distillates, hydrofluoric acid, sulfuric acid, oil, and deoxidizers. The area is approximately 80 square feet in size and contains roughly 1,400 gallons of chemicals.

**Spill Control** - Valves on all drums are spring loaded to reduce spillage. The material from any drums that might rupture would be removed with a combination of vacuum, absorbant broom, and a drying material. All spilled material will be disposed of in an appropriate manner.

**FIBERGLASS AREA** - Hazardous materials used in the fiberglass area are limited to resins which contain small quantities of styrene. One 55 gallon drum is used at a time and resin is directly withdrawn from the drum.

**Spill Control** - Any spills would be minor in nature and would be removed with an absorbant broom and absorbant drying materials. Captured materials would then be properly disposed.

**SPRAY PAINTING OPERATIONS** - Spray painting occurs in the paint hanger and process area of the plant. See site plan for specific locations. Water wash ventilation systems are used in both areas to exhaust paint overspray and volatiles. Zinc-cromate based paint is used in the process area. Conventional paints are used in the spray painting hanger.

**Spill Control** - The wastewater is removed from the water wash booths every three months by an outside contractor and properly disposed. Spill potential is limited to days when the booths are emptied. Clean up crews will be immediately available to visually inspect waste removal operations and respond to a spill situation.

**WASTE DISPOSAL ACTIVITIES:**

**STORAGE AREA** - Hazardous wastes awaiting disposal or reclamation are accumulated in 55 gallon drums and stored in the waste storage area. Drums are segregated and stored in appropriate locations within the facility. The contents of the drums are carefully inventoried, documented, and dated. When drums are accumulated in sufficient quantities for either disposal or reclamation, they are removed from the site and properly disposed by an outside contractor.

### EVACUATION PLAN:

Evacuation plans will be initiated and their extent determined by the emergency coordinator. The signal to begin evacuation will be given over the company loud speaker. This will be followed by voice orders over the loud speaker and orders from area supervisors directing the evacuation. The all clear directive will be followed by voice orders over the loud speaker and by directions of evacuation guides.

All employees in the effected area will be directed to a safe area of the plant. Fire, explosion, and disaster procedures presently in practice at Gulfstream American will determine primary and alternative evacuation routes.

### DESCRIPTION OF OUTFALLS:

Waste water from the Gulfstream Plant consists of both contact and non-contact process water and discharges into the Bethany municipal sanitary sewer system, ultimately being discharged into the North Canadian River, after treatment.

Storm water run-off from rooftops, parking lots, and driveways exits the Gulfstream Facility in several locations where municipal streets and stormwater drainage systems collect and carry the run off to the west of the plant site.

## **REFERENCE 7**



## Gulfstream Aerospace Technologies

7400 N.W. 50th Wiley Post Airport  
P.O. Box 22500  
Oklahoma City, Oklahoma 73123  
Telephone: (405) 789-5000 Telex: 203122 GCOM OKC

January 4, 1991

ICF Kaiser Engineers, Inc.  
1509 Main Street  
Suite 900  
Dallas, Texas 75201-4809

Attn: Robert D. Taaffe

Dear Mr. Taaffe,

Enclosed are the requested copies of the waste manifest showing the disposal of the 53 drums of contaminated soil and rock. (See page 3 blocks C and D.) There is no other manifest that shows the disposal of contaminated soil for the year of 1986. So I believe that this shipment to be the soil that was contaminated by the acid spill early in the year.

If I may be of any other assistance in this matter, please call 405-789-5000.

Sincerely,

W.S. Clements  
Manager Safety

WSC/sb





Industrial Waste Division  
Oklahoma State Department of Health  
P.O. Box 53551  
Oklahoma City, Oklahoma 73152  
(405) 271-5338

NATIONAL EMERGENCY RESPONSE CENTER:  
(800) 424-8802

Press hard you are making six (6) copies. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2000-0404 Expires 7-31-86

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. OKT410010321	Manifest Document No. 25086	2. Page 1 of 3	Information in the shaded areas is not required by Federal law.
3. Generator's Name and Mailing Address SULFSTREAM AEROSPACE CORP. PO BOX 22520 OKLAHOMA CITY, OK. 73123				A. State Manifest Document Number (Okla.) 25086	
4. Generator's Phone (405) 789-5000				B. State Generator's ID (Okla.) 55109	
5. Transporter 1 Company Name U.S. POLLUTION CONTROL				C. State Transporter's ID (Okla.) 2004	
6. US EPA ID Number OKD981514474				D. Transporter's Phone (405) 342-5066	
7. Transporter 2 Company Name				E. State Transporter's ID (Okla.)	
8. US EPA ID Number				F. Transporter's Phone	
9. Designated Facility Name and Site Address LOVE MOUNTAIN SOLVENT REC. U.S. POLLUTION CONTROL INC RR 2 BOX 130A WYANDOKA, OK				G. State Facility's ID (Okla.) RR47001 & 5047002	
10. US EPA ID Number OKD065438376				H. Facility's Phone (405) 697-3237	
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)		12. Containers	13. Total Quantity	14. Unit	1. Waste No.
a. HM WASTE PAINT RELATED MATERIAL FLAMMABLE LIQ. NA1263		No. 1 Type DM	55	9	Okla. 104110 EPA 0001
b. WASTE (PAINT & M.E.K. SOLVENT) FLAMMABLE LIQUID UN1193		No. 1 Type DM	55	9	Okla. 104110 EPA 0001
c. WASTE POISON B LIQUID N.O.S. UN2810		No. 2 Type DM	110	9	Okla. 765612 EPA
d. WASTE CORROSIVE SOLIDS N.O.S. UN1759		No. 1 Type DM	30	9	Okla. 725606 EPA 0002
J. Additional Descriptions for Materials Listed Above A) BICHLOROMETHANE WASTE E86-489 3085 C) DRUM NOS. LP20 & LP22 E86-685 D) DRUM NO. 654 E86-685				K. Handling Codes for Wastes Listed Above	
15. Special Handling Instructions and Additional Information					
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. Unless I am a small quantity generator who has been exempted by statute or regulation from the duty to make a waste minimization certification under Section 3002(b) of RCRA, I also certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment.					
Printed/Typed Name Gerald Williams				Signature Gerald Williams Date 11/16/86	
17. Transporter 1 Acknowledgement of Receipt of Materials				Date	
Printed/Typed Name Mike Isbell				Signature Mike Isbell Date 11/16/86	
18. Transporter 2 Acknowledgement or Receipt of Materials				Date	
Printed/Typed Name				Signature Date Month Day Year	
19. Discrepancy Indication Space GENERATOR NOTIFIED OF MANIFEST CHANGES					
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.					
Printed/Typed Name Mark Blankenship				Signature Mark Blankenship Date 11/16/86	

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b> (Continuation Sheet)		21. Generator's US EPA ID No. <b>OKT410010821</b>	Manifest Document No. <b>25066</b>	22. Page <b>2</b>	Information in the shaded areas is not required by Federal law.
23. Generator's Name <b>GULFSTREAM AEROSPACE CORP.</b> <b>PO BOX 22500</b> <b>OKLAHOMA CITY, OK, 73123</b>				L. State Manifest Document Number (Okla.) <b>25066</b>	
				M. State Generator's ID (Okla.) <b>55109</b>	
24. Transporter <u>1</u> Company Name <b>U.S. POLLUTION CONTROL</b>		25. US EPA ID Number <b>OKD98154474</b>		N. State Transporter's ID (Okla.) <b>204</b>	
26. Transporter _____ Company Name		27. US EPA ID Number		O. Transporter's Phone <b>(405) 342-5066</b>	
				P. State Transporter's ID (Okla.)	
				Q. Transporter's Phone	

28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HS	29. Containers No. Type	30. Total Quantity	31. Unit Wt. Vol	R Waste No.
a. <b>WASTE OXIDIZER CORROSIVE LIQUID N.O.S.</b> <b>NA 9193</b>	<b>Y</b>	<b>1 DM</b>	<b>30</b>	<b>9</b>	Okla. <b>725606</b> EPA <b>0302</b>
b. <b>HAZARDOUS WASTE SOLID N.O.S.</b> <b>ORM-E NA 9189</b>		<b>1 DM</b>	<b>55</b>	<b>9</b>	Okla. <b>764103</b> EPA
c. <b>WASTE CORROSIVE LIQUID N.O.S.</b> <b>UN1760</b>	<b>X</b>	<b>1 DM</b>	<b>55</b>	<b>9</b>	Okla. <b>020102</b> EPA <b>B0002</b>
d. <b>WASTE CHROMIC ACID SOLUTION N.O.S.</b> <b>UN1755</b>	<b>X</b>	<b>1 DM</b>	<b>30</b>	<b>9</b>	Okla. <b>020102</b> EPA
e. <b>HAZARDOUS WASTE SOLID N.O.S.</b> <b>ORM E NA 9189</b>		<b>3 DM</b>	<b>255</b>	<b>9</b>	Okla. <b>764103</b> EPA
f. <b>HAZARDOUS WASTE SOLID N.O.S.</b> <b>ORM E NA 9189</b>		<b>1 DM</b>	<b>55</b>	<b>9</b>	Okla. <b>764103</b> EPA
g. <b>WASTE POISON B LIQUID</b> <b>UN2810</b>		<b>2 DM</b>	<b>110</b>	<b>9</b>	Okla. <b>765612</b> EPA
h. <b>WASTE POISON SOLID N.O.S.</b> <b>POISON A UN2811</b>		<b>1 DM</b>	<b>30</b>	<b>9</b>	Okla. <b>765612</b> EPA
i. <b>WASTE CORROSIVE LIQUID N.O.S.</b> <b>UN1760</b>		<b>1 DM</b>	<b>30</b>	<b>9</b>	Okla. <b>725606</b> EPA

S. Additional Descriptions for Materials Listed Above		T. Handling Codes for Wastes Listed Above
<b>1) DRUM # LP23 E86-695</b> <b>2) DRUM # 634 E86-685</b> <b>3) DRUM # LP17 E86-685</b> <b>4) DRUM # 651 E86-685</b> <b>5) DRUM # 640-641-646 E86-714</b>		<b>1) DRUM # 634</b> <b>2) DRUM # 660-LP21</b> <b>3) DRUM # 655 E86-809</b> <b>4) DRUM # LP24</b> <b>5) DRUM # 640-641-646</b>

32. Special Handling Instructions and Additional Information

33. Transporter <u>1</u> Acknowledgement of Receipt of Materials		Date
Printed/Typed Name <b>Mike Isbell</b>	Signature <b>Mike Isbell</b>	Month <b>11</b> Day <b>16</b> Year <b>86</b>
34. Transporter _____ Acknowledgement of Receipt of Materials		Date
Printed/Typed Name	Signature	Month Day Year

35. Discrepancy Indication Space

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b> (Continuation Sheet)		21. Generator's US EPA ID No. <b>OKT410010821</b>	Manifest Document No. <b>25066</b>	22. Page <b>3</b>	Information in the shaded areas is not required by Federal law.
23. Generator's Name <b>BULFSTREAM AEROSPACE CORP.</b> <b>PO BOX 22500</b> <b>OKLAHOMA CITY, OK 73123</b>				L. State Manifest Document Number (Okla.) <b>25066</b>	
24. Transporter <u>1</u> Company Name <b>U.S. POLLUTION CONTROL</b>				N. State Transporter's ID (Okla.) <b>2004</b>	
25. US EPA ID Number <b>OKD98154474</b>				O. Transporter's Phone <b>(405) 342-5066</b>	
26. Transporter _____ Company Name				P. State Transporter's ID (Okla.)	
27. US EPA ID Number				Q. Transporter's Phone	
28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)		29. Containers No. Type		30. Total Quantity 31. Unit Wt. Vol.	
a. <b>(WASTE BLUE CHIP COOLANT &amp; WATER)</b> <b>HAZARDOUS WASTE LIQUID, NA, ORM-E CC</b> <b>NA 9189</b>		<b>2 DM 110</b>		<b>9</b> Okla. <b>193312</b> EPA	
b. <del>WASTE FLAMMABLE SOLID/LIQUID N.O.S.</del> <b>HAZARDOUS WASTE SOLID, NA, ORM-E NA 9189</b> <b>NA 1325 CC</b>		<b>2 DM 110</b>		<b>9</b> Okla. <b>104110</b> EPA	
c. <b>(CONTAMINATED SOIL &amp; ROCK) ORM-E</b> <b>HAZARDOUS WASTE SOLID N.O.S. NA 9189</b>		<b>20 DM 1100</b>		<b>9</b> Okla. <b>760102</b> EPA	
d. <b>(CONTAMINATED SOIL &amp; ROCK) ORM-E</b> <b>HAZARDOUS WASTE SOLID N.O.S. NA 9189</b>		<b>33 DM 1815</b>		<b>9</b> Okla. <b>793313</b> EPA	
e.				Okla. EPA	
f.				Okla. EPA	
g.				Okla. EPA	
h.				Okla. EPA	
i.				Okla. EPA	
S. Additional Descriptions for Materials Listed Above <div style="display: flex; justify-content: space-between;"> <div> <b>Solut.</b>  <b>35201</b> </div> <div> <b>E86-586</b>  <b>E86-489</b>  <b>E86-717</b> </div> <div> <b>Scmt. 35211*</b>  <b>E86-1067</b> </div> </div>				T. Handling Codes for Wastes Listed Above	
32. Special Handling Instructions and Additional Information					
33. Transporter <u>1</u> Acknowledgement of Receipt of Materials Printed/Typed Name <b>Mike Isbell</b> Signature <b>Mike Isbell</b>					Date <b>11/06/86</b>
34. Transporter _____ Acknowledgement of Receipt of Materials Printed/Typed Name _____ Signature _____					Date Month Day Year
35. Discrepancy Indication Space					

## **REFERENCE 8**

# Description of Underground Storage Tanks

Airport: Wiley Post Airport  
Location: Gulfstream Aerospace  
Date: Oct-90

	Tank No. 1	Tank No. 2	Tank No. 3	Tank No. 4	Tank No. 5	Tank No. 6
Status of Tank						
Currently in Use	x	x	x	x		
Temporarily Out of Use						
Permanently Out of Use					x	x
In Use after 5/8/86						
Estimated Age (years)	20	14	14	14	25	25
Estimated Capacity	1000	1000	20000	10000	3000	3000
Construction Materials						
Steel	x	x	x	x	x	x
Concrete						
Fiberglass (FRP)						
Unknown						
Other						
Internal Protection						
Cathodic						
Interior Lining						
None						
Unknown	x	x	x	x	x	x
Other						
External Protection						
Cathodic						
Painted (Asphaltic)	x	x	x	x	x	x
Fiberglass (FRP) coat						
None						
Other						
Piping						
Bare Steel	x	x	x	x	x	x
Galvanized Steel						
Fiberglass (FRP)						
Cathodic Protected						
Unknown						
Other						
Substance Last Stored						
A. Empty					x	x
B. Petroleum						
Diesel		x				
Kerosene						
Gasoline	x-UL					
Used Oil						
Other			JET	JET		
C. Hazardous Waste						
D. Unknown						
For Tanks Permanently Out-Of-Service						
Estimated Last Use					Jun-75	Jun-75
Estimated Quantity Left					0	0
Filled with Inert Material						

Airport:  
Location:  
Date:

Wiley Post Airport  
Gulfstream Aerospace  
Oct-90

	Tank No. 7
Status of Tank	
Currently in Use	
Temporarily Out of Use	
Permanently Out of Use	x
In Use after 5/8/86	
Estimated Age (years)	23
Estimated Capacity	10000
Construction Materials	
Steel	x
Concrete	
Fiberglass (FRP)	
Unknown	
Other	
Internal Protection	
Cathodic	
Interior Lining	
None	
Unknown	x
Other	
External Protection	
Cathodic	
Painted (Asphaltic)	x
Fiberglass (FRP) coat	
None	
Other	
Piping	
Bare Steel	
Galvanized Steel	x
Fiberglass (FRP)	
Cathodic Protected	
Unknown	
Other	
Substance Last Stored	
A. Empty	x
B. Petroleum	
Diesel	
Kerosene	
Gasoline	
Used Oil	
Other	
C. Hazardous Waste	
D. Unknown	
For Tanks Permanently Out-Of-Service	
Estimated Last Use	Apr-68
Estimated Quantity Left	0
Filled with Inert Material	x

# Compliance Information Sheet

Tank Nos 1  
 Location Wiley Post Gulfstream Aerospace  
 Age 21  
 Status In Compliance

## Prevention Equipment & Practices Currently In-Place

	Yes	No
Corrosion Protection		x
Spill/Overfill Prevention		x
Leak Detection		x
Tank "Tightness" Testing		x
Manual Tank Gauging		x
Automatic Tank Gauging		x
External Monitoring		x

## Site Inspection

Ground cover concrete  
 Visual Contamination none  
 Proximity to Utilities unknown

## EPA Schedule for Phase-In of Release Detection

Year	1989	1990	1991	1992	1993
Installed					
Unknown	RD	P			
> 1965	RD	P			
'65-'69		P/RD			
'70-'74		P	RD		
'75-'79		P		RD	
'80-'88		P			RD

Shaded area is scheduled phase-in deadline year

P= Release detection for all pressurized piping

RD= Release detection for tanks and suction piping

# Compliance Information Sheet

Tank Nos 2 thru 4  
 Location Wiley Post Gulfstream Aerospace  
 Age 14  
 Status In Compliance

## Prevention Equipment & Practices Currently In-Place

	Yes	No
Corrosion Protection		x
Spill/Overfill Prevention		x
Leak Detection		x
Tank "Tightness" Testing		x
Manual Tank Gauging		x
Automatic Tank Gauging		x
External Monitoring		x

## Site Inspection

Ground cover	concrete
Visual Contamination	none
Proximity to Utilities	unknown

## EPA Schedule for Phase-In of Release Detection

Year	1989	1990	1991	1992	1993
Installed					
Unknown	RD	P			
> 1965	RD	P			
'65-'69		P/RD			
'70-'74		P	RD		
'75-'79		P		RD	
'80-'88		P			RD

Shaded area is scheduled phase-in deadline year

P= Release detection for all pressurized piping

RD= Release detection for tanks and suction piping



# Compliance Information Sheet

Tank Nos 5, 6, 7  
 Location Wiley Post Gulfstream Aerospace  
 Age 25, 25, 23  
 Status Permanent Closure

## Prevention Equipment & Practices Currently In-Place

	Yes	No
Corrosion Protection		N/A
Spill/Overfill Prevention		N/A
Leak Detection		N/A
Tank "Tightness" Testing		N/A
Manual Tank Gauging		N/A
Automatic Tank Gauging		N/A
External Monitoring		N/A

## Site Inspection

Ground cover	concrete
Visual Contamination	none
Proximity to Utilities	unknown

## EPA Schedule for Phase-In of Release Detection

Year	1989	1990	1991	1992	1993
Installed					
Unknown	RD	P			
> 1965	RD	P			
'65-'69		P/RD			
'70-'74		P	RD		
'75-'79		P		RD	
'80-'88		P			RD

Shaded area is scheduled phase-in deadline year

P= Release detection for all pressurized piping

RD= Release detection for tanks and suction piping

## **REFERENCE 9**

1509 Main Street, Suite 900  
Dallas, Texas  
75201-4809

214/744-1641



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## ICF TECHNOLOGY INCORPORATED

TO: Ed Sierra, Region VI, RPO

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DATE: August 20, 1990 PAN: FOK0345PAA

SUBJ: Preliminary Assessment  
Gulfstream Aerospace, Corp., Bethany, Oklahoma County, Oklahoma.  
(OKD981518327).

Attached is the Preliminary Assessment Report of Gulfstream Aerospace, Corp.

**PRELIMINARY ASSESSMENT**

**of**

**GULFSTREAM AEROSPACE, CORP.**

**(OKD981518327)**

**Prepared By**

**Don L. Hudnall, FIT Toxicologist**

**ICF Technology, Inc.  
Region VI**

**August 20, 1990**

**PRELIMINARY ASSESSMENT  
of  
GULFSTREAM AEROSPACE, CORP.**

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### TABLE

### TITLE

1	Description of Chemicals Stored and Used at Gulfstream Aerospace, Corp.
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## 1. SITE INFORMATION

The Region VI Field Investigation Team (FIT) was tasked by the U.S. Environmental Protection Agency (EPA) under Technical Directive Document (TDD) F-06-9002-18 to conduct the Preliminary Assessment (PA) of Gulfstream Aerospace, Corp. (OKD981518327) in Bethany, Oklahoma County, Oklahoma.

### 1.1 SITE LOCATION

Gulfstream Aerospace, Corp. is located south of Wiley Post Airport on 50th Street in Bethany, Oklahoma County, Oklahoma. Although the site is on the opposite side of 50th Street, Wiley Post Airport and Gulfstream Aerospace share the same mailing address of 5001 North Rockwell, Bethany, Oklahoma 73008. The site coordinates are 95° 38' 35" north latitude and 95° 31' 15" west longitude (Figure 1).

### 1.2 SITE BACKGROUND

The site is privately owned by the Chrysler Corporation (telephone: 405/789-5000). Mr. Bill Humes is the Gulfstream Aerospace Senior Vice-President (Ref. 1). It is not known when the site began business at this location.

## 2. BACKGROUND AND OPERATING HISTORY

This section addresses site history and operations, known and potential problems, and regulatory involvement of federal, state or local agencies.

### 2.1 SITE HISTORY

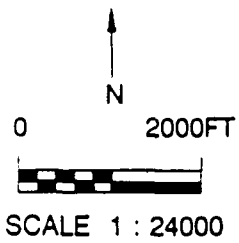
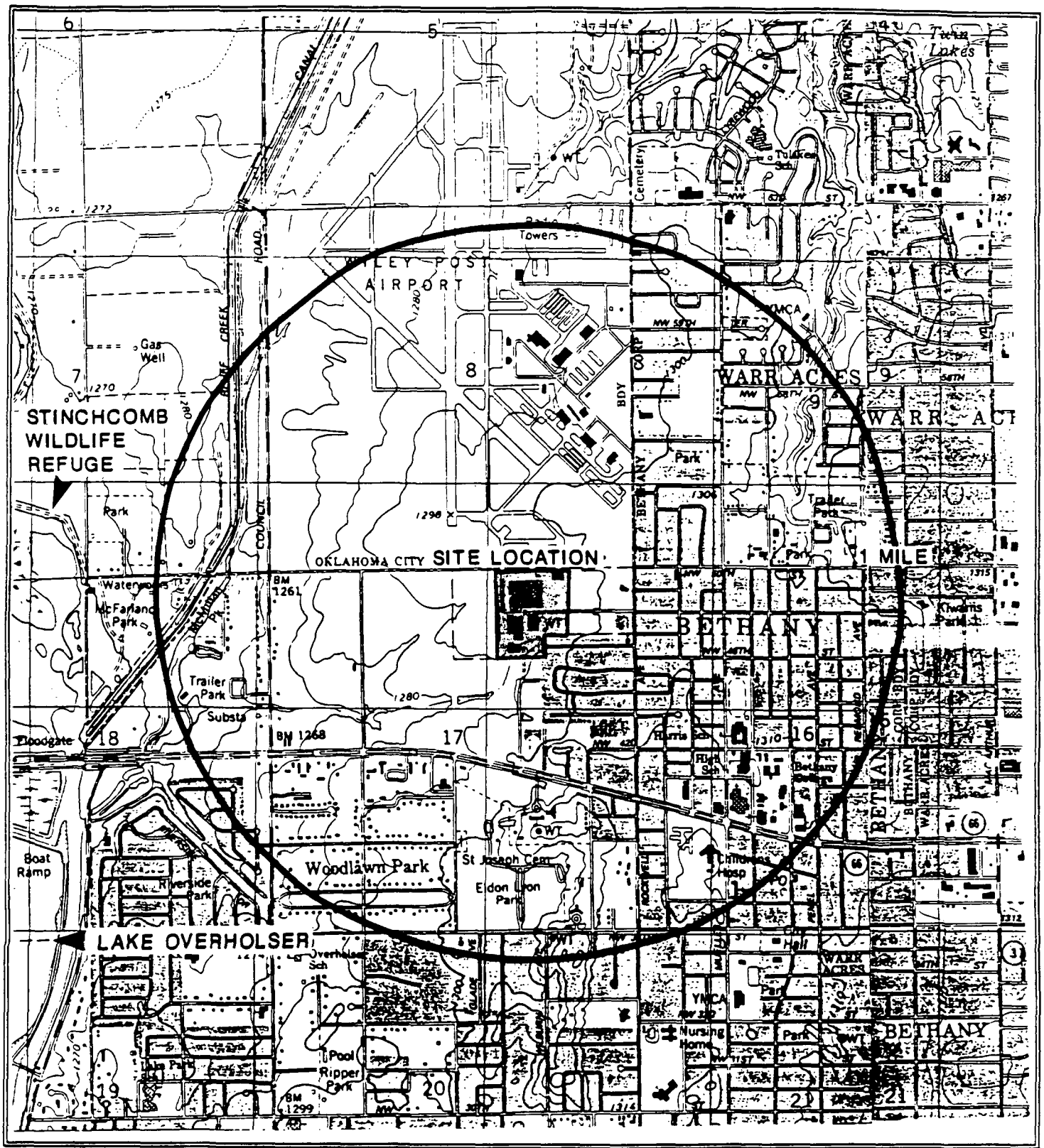
Gulfstream Aerospace is a manufacturer of aircraft parts. A spill of hydrofluoric and chromic acid was reported on May 22, 1986. The removed soil and remaining soil were sampled. Analysis revealed that the soil was EP toxic for chromium and lead. During sampling, it was pointed out that lead contaminated foundry sand had previously been dumped on the ground (Ref. 1, p. 8). As of July 11, 1986, the facility was in the process of cleaning out old chemical products and had accumulated large amounts of wastes. The wastes were stored in 55-gallon drums in the hazardous waste storage area. The facility exceeded the 90 day holding limit before removing the labelled wastes. The drums were dated March 6, 1986 (Figure 2) (Ref. 1, p. 9).

### 2.2 KNOWN AND POTENTIAL PROBLEMS

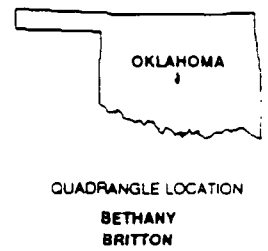
Potential contaminants of concern include the chromium and lead contaminated soil area. There are also several storage areas on-site which may be potential problems.

A hazardous waste storage area contains 55-gallon drums on a bermed concrete floor. The number of drums stored in this area is not known. The area encompasses approximately 750 square feet and is located at the southern end of the plant (Table 1) (Ref. 1, p. 46).





Site Location Map  
 GULFSTREAM AEROSPACE CORP.  
 BETHANY, OK  
 TDD NO. F-06-9002-18  
 CERCLIS NO. OKD981518327  
 FIGURE 1



# TABLE 1

## DESCRIPTION OF CHEMICALS STORED AND USED AT GULFSTREAM AEROSPACE, CORP.

	Location	Size of Area	Chemicals Stored
(1)	Hazardous Waste Storage Area	750 square feet	Variety of Wastes
(2)	Barrel House	20 x 40 feet flammable storage area	trichloroethylene methyl ethyl ketone liquid smut deoxidizer lubricants unknown others
(3)	Paint Storage Area	40 x 40 feet flammable storage area	paint thinner paints primer battery acid styrene toluene sodium silicate rubber cement
(4)	Tooling Area	80 square feet	petroleum distillates oil hydrofluoric acid sulfuric acid deoxidizer

A barrel house stores, in 55-gallon drums, chemicals used in the manufacturing process, including trichloroethylene, methyl ethyl ketone, liquid smut and lubricants. Approximately 3,500 gallons of chemicals are housed in a 20 x 40 foot section of a flammable storage area (Ref. 1, p. 47). A paint storage area is located within the larger flammable section. The paint area is 40 x 40 feet and is on the same wall as the barrel house. Chemicals stored in this area include paints, paint thinner, primer, battery acid, styrene and toluene (Table 1) (Ref. 1, p. 47).

A storage area is located outside the tooling section. Petroleum distillates, hydrofluoric acid, sulfuric acid, oil and deoxidizers are stored on a bermed concrete pad approximately 80 square feet. Approximately 1,400 gallons of chemicals are stored in this area (Ref. 1, p. 49).

The FIT conducted an off-site reconnaissance inspection on July 5, 1990. The FIT noted that Gulfstream Aerospace was surrounded by a 10 foot fence, with the main entrances on 50th Street. Most of the site consists of large buildings. Aircraft taxiways are located on the west and south sections. There are open fields on the east and west sides of Gulfstream.

The site is accessible through the main building. The gates along the south and west taxiway leading to 50th Street are kept locked. No storage areas were visible from the road.

The only files were found in the Waste Generator Section of the Oklahoma State Department of Health (OSDH) (Ref. 1).

## 2.3 REGULATORY INVOLVEMENT

No federal, state or local involvement has been documented.

## 3. WASTE CONTAINMENT AND HAZARDOUS SUBSTANCE IDENTIFICATION

Waste generation and containment are addressed in this section.

### 3.1 DOCUMENTATION

Information indicated a spill of hydrofluoric and chromic acid on May 22, 1986. Lead was found during sampling. The source of lead is apparently from lead contaminated foundry sand that had been dumped in the area (Ref. 1, p. 8).

### 3.2 WASTE GENERATION

Specific on-site wastes have not been identified. Labels were missing from drums of hazardous waste during the July 11, 1986 OSDH inspection (Ref. 1, p. 9). The hazardous waste storage area is approximately 750 square feet and located at the southern end of Gulfstream Aerospace (Ref. 1, p. 46).

### 3.3 CONTAINMENT

Containment systems were unable to be seen during the off-site reconnaissance inspection. The hazardous waste storage area is in the southern section of Gulfstream. All storage areas with concrete pads may be located within the site buildings (Ref. 1).

## 4. PATHWAY CHARACTERISTICS

This section characterizes environmental pathways and evaluates the potential of contaminant migration from the facility.

### 4.1 GROUND WATER

Terrace deposits of sand, silt, clay and gravel are known locally as the Bethany terrace. The City of Bethany pumps water from this terrace. The deposit also supplies water for residential gardening. Test holes drilled for the Bethany Water Department indicate that the terrace deposits have a maximum depth of approximately 80 feet. The depth to the water is approximately 30 feet from land surface. The ground water flow is generally toward Bluff Creek (Ref. 2, pp. 23 - 25).

Below the Bethany terrace deposits are the Garber Sandstone and Wellington Formation. The Garber and Wellington constitute a single aquifer and consist of lenticular beds of sandstone, siltstone and shale. Fresh water may be reached approximately 800 feet below the surface. The City of Bethany utilizes 3 ground water wells of undetermined depths from this aquifer (Ref. 2, pp. 29 - 30). The population of Bethany is approximately 23,000 (Ref. 5). Net precipitation for the area is 32 inches (Ref. 9).

### 4.2 SURFACE WATER

Gulfstream Aerospace lies northeast of Lake Overholser. Drainage from the site would proceed downgradient to Bluff Creek, which flows into the southern tip of Stinchcomb Wildlife Refuge before entering Lake Overholser. Drainage would need to travel approximately 1 mile overland before reaching Bluff Creek (Figure 1). The site does not lie within a 100 year floodplain (Ref. 6). The 2 year, 24 hour rainfall for this area is approximately 4 inches (Ref. 7).

Lake Overholser serves as a water supply source. The lake is used for boating and fishing. Swimming is not permitted (Ref. 3). Lake Overholser accepts water from the North Canadian River, which flows through Stinchcomb Wildlife Refuge (Figure 1). The Interior Least Tern, a rare species, lives around Rose Lake near the refuge. The Bald Eagle and Whooping Crane sporadically visit Stinchcomb Wildlife Refuge, but do not live there (Ref. 8).

### 4.3 SOIL EXPOSURE

Sample analysis indicated that the soil from a section of Gulfstream Aerospace became contaminated with chromium as a result of a spill of hydrofluoric and chromic acid on May 22, 1986. Analysis also indicated lead from foundry sand disposal (Ref. 1, p. 27). The spill area could not be identified from the FIT

off-site reconnaissance inspection. It is not known if the soil has been completely removed. The only public access would be through the building's main entrance. There are 2 large, locked gates along the taxiways on the south and west sides of the site. The number of on-site workers is not known.

#### 4.4 AIR

The spilled contaminants of concern are heavy metals (chromium and lead). There is not a gas migration potential. The metals are, however, available for particulate transport. There are volatile components stored in 55-gallon drums on-site, but there is no documentation of past air releases. The nearest residents are within 500 feet of the site (Figure 1).

#### 4.5 GROUND WATER RELEASE TO SURFACE WATER

The Bethany Terrace deposits are associated with stream courses. Water pumped from the terrace is used in Bethany for residential gardening. This ground water source is recharged by infiltration of precipitation on the terrace surface. The ground water is generally toward Bluff Creek (Ref. 2, pp. 23 and 25).

### 5. TARGETS

This section characterizes the environmental pathways and associated targets of contaminant migration from the facility.

#### 5.1 GROUND WATER

The nearest well location is not known, but is potentially less than 500 feet from the site. Residents in the area use the shallow ground water for residential gardening (Ref. 2, p. 25). The City of Bethany has 3 ground water wells used for drinking water purposes (Ref. 2). Because Bethany is within a 4 mile radius of the site, it is likely that the City wells are also within this radius (Figure 1) (Ref. 1, p. 25; Ref. 4). The population of Bethany is approximately 23,000 (Ref. 5). Municipal wells are considered to be in a wellhead protected area.

#### 5.2 SURFACE WATER

Bluff Creek is approximately 1 mile west, overland from Gulfstream Aerospace (Figure 1). Migration into the creek would not be rapid because Bethany is not prone to flooding (Ref. 6). The FIT noted that the base and sides of the creek had been dredged, then coated with cement. No fishing or intakes would be possible. Lake Overholser is used as a water supply source. The location and use of the intake have not been determined. Lake Overholser is also used for boating and fishing, but not swimming (Ref. 3).

### 5.3 SOIL EXPOSURE

The nearest residents are within 500 feet of the site (Figure 1). The population of Bethany within a 4 mile radius is approximately 23,000 (Ref. 5). The site is not readily accessible to the general public. The site is fenced and has locked gates along the taxiways leading to 50th Street.

### 5.4 AIR

The nearest resident is less than 500 feet from the site. The southern and eastern lands are used for residential purposes. The land to the north of Gulfstream is Wiley Post Airport, and the area to the west is the Stinchcomb Wildlife Refuge (Figure 1).

## 6. CONCLUSIONS

Gulfstream Aerospace, Corp. is a manufacturer of aircraft parts. Potential contaminants of concern are chromium and lead, which were detected in soil samples. Other potential contaminants of concern would be trichloroethylene, methyl ethyl ketone (barrel house), paint thinner, styrene, toluene (paint storage area), hydrofluoric acid, sulfuric acid, petroleum distillates (tooling area) and a variety of waste stored in the hazardous waste storage area. Ground water in Bethany is used for drinking and irrigational purposes. The surface water may be of concern because Bluff Creek (less than 1 mile from Gulfstream) flows into Stinchcomb Wildlife Refuge before emptying into Lake Overholser. Lake Overholser is used as a water supply, for boating and fishing, but not swimming. The soil exposure pathway is a concern for on-site workers. The general public, however, does not have access to the facility. The air exposure pathway is not of concern because the spill area contains only heavy metals and there is no documentation of past air releases.

## PA DOCUMENTATION LOG SHEET

SITE NAME Gulfstream Aerospace, Corp.CITY BethanySTATE OKIDENTIFICATION NUMBER OKD981518327

REFERENCE NUMBER	DESCRIPTION OF THE REFERENCE
1	Oklahoma Controlled Industrial Waste Compliance Inspection. Site Identification. Prepared by the Oklahoma State Department of Health. July 11, 1985.
2	Ground Water Resources, Cleveland and Oklahoma Counties. Oklahoma Geological Survey. Circular 71. 1968.
3	Record of Communication. Information on Surface Water Usage for Lake Overholser. From: Don L. Hudnall, FIT Toxicologist, ICF Technology, Inc. To: Pat Hestand, Oklahoma Water Resources Board. August 8, 1990.
4	Oklahoma Water Use Data System. Alphabetical Listing of Users with Permits. June 1, 1990.
5	Record of Communication. Population of Bethany, Oklahoma. From: Don L. Hudnall, FIT Toxicologist, ICF Technology, Inc. To: Paula Parker, Bethany, Oklahoma, Chamber of Commerce. August 9, 1990.
6	National Flood Insurance Program Community Status Book. Federal Emergency Management Agency. May 28, 1986.
7	Rainfall Frequency of the United States. U. S. Department of Agriculture. May 1961.
8	Record of Communication. Information on Sensitive Environments and Endangered Species. From: Don L. Hudnall, FIT Toxicologist, ICF Technology, Inc. To: John Skeen, Oklahoma Department of Wildlife. August 15, 1990.
9	U. S. Department of Commerce. Climatic Atlas of the United States. June 1982. Reprinted by the National Oceanic and Atmospheric Administration, 1983.

## **REFERENCE 10**





## ICF TECHNOLOGY INCORPORATED

TO: File

FROM: Catherine Goetz, FIT Geologist *C. G.*

DATE: October 2, 1991

SUBJ: On-site Reconnaissance Inspection Observations  
Gulfstream Aerospace Corporation, Bethany, Oklahoma County, Oklahoma  
OKD981518327

On January 3, 1991, FIT members Robert Taaffe, Catherine Goetz and Don Hudnall, Jr. conducted an on-site inspection at GAC. This inspection provided sufficient information for development of a representative sampling plan. The FIT observed similar conditions to those described in past inspections, with the addition of a graded, gravel covered west side roadbed and an on-site runoff collection system with off-site effluent disposal. The site was dry and the weather extremely cold at the time of the inspection. The FIT did not see any areas of stained or discolored soil. The FIT did notice a residential area near the GAC hazardous waste storage area. In addition, the FIT examined the west side roadbed where the residue of the chromic acid spill was contained that has been covered with gravel.

During the inspection, the potential for an observed soil release, air release and the presence of air-borne contaminants was monitored with an HNu and a Rad-Mini for the detection of volatile organics or radiation. Monitoring did not indicate levels above background.

GAC is surrounded by a 10 foot fence, with the main entrances on NW 50th Street. All gates are locked or manned by security personnel. The work areas on-site are contained within several large buildings. An aircraft taxiway is located on the east section. There are open fields on the east, south and west side of GAC.

A wastewater treatment system on-site has a treatment capacity of 24 gallons per minute prior to discharge. Three storage areas are bermed and enclosed. A sump pump is located within the hazardous waste storage area. The materials from the sump pump are collected in a 5,000 gallon above ground tank. The facility also has two 5,000 gallon waste overflow holding tanks. The tanks generally store wastewater for treatment. An inspection of the hazardous waste storage area, located at the southeast corner of the plant, found the potential for chemical runoff into an adjacent ditch.

## **REFERENCE 11**

OKLAHOMA  
GEOLOGICAL  
SURVEY

CIRCULAR 71

Ground-Water Resources  
Cleveland and Oklahoma Counties

P. R. WOOD

*and*

L. C. BURTON

1968

OKLAHOMA GEOLOGICAL SURVEY

CHARLES J. MANKIN, *Director*

CIRCULAR 71

# Ground-Water Resources in Cleveland and Oklahoma Counties, Oklahoma

P. R. WOOD AND L. C. BURTON  
*U. S. Geological Survey*

Prepared under a cooperative agreement between  
Oklahoma Geological Survey and U. S. Geological Survey

The University of Oklahoma

Norman

1968

# Ground-Water Resources in Cleveland and Oklahoma Counties, Oklahoma

P. R. WOOD AND L. C. BURTON

## ABSTRACT

Cleveland and Oklahoma Counties, in central Oklahoma, have a combined area of 1,252 square miles and a range in altitude of from 870 to 1,400 feet above sea level. The annual precipitation is about 33 inches at Norman and about 32 inches at Oklahoma City. In 1960 the two counties had a population of 487,000, of which 95 percent lived in the Norman and Oklahoma City urban areas and 5 percent lived in small towns and rural areas. General farming and livestock breeding are the predominant types of agriculture. Industry is widely diversified and is expanding rapidly.

Rocks exposed at the surface are Permian and Quaternary in age. The Permian rocks include the Wellington Formation, Garber Sandstone, Hennessey Shale, Duncan Sandstone, and Chickasha Formation. The Quaternary rocks include terrace deposits at one or more levels along the valleys of the principal streams, alluvium, and dune sand.

The terrace deposits and alluvium supply ground water for domestic and stock use at many places in the two counties. The alluvial deposits along the North Canadian River at Oklahoma City are capable of yielding 200 or more gallons of water per minute to properly developed wells. The Chickasha Formation, Duncan Sandstone, and Hennessey Shale yield small quantities of hard water to wells. In places, water from wells 100 or more feet deep is too highly mineralized for most uses.

The principal sources of ground water used for municipal and industrial purposes are the Garber Sandstone and the Wellington Formation. The two formations were deposited under similar conditions, and both consist of lenticular beds of sandstone alternating with shale. Beds may vary greatly in thickness within short lateral distances.

At variable depths below the land surface the Garber and Wellington contain water too highly mineralized for most uses. Hence, the depth to which wells may be drilled in search of potable water supplies is largely determined by the depth at which salt water is encountered. In southeastern Cleveland County salt water occurs about 100 feet below land surface. In eastern Cleveland and Oklahoma Counties salt water occurs at depths ranging from 200 to 660 feet below land surface. In the Oklahoma City, Lake Hefner, and Edmond areas salt water is 700 to 800 feet below land surface; in the Midwest City area, more than 1,000 feet; at Norman, 700 feet; and at Noble, 400 feet.

## GEOLOGY

The rocks exposed in Cleveland and Oklahoma Counties include consolidated sedimentary rocks (redbeds) of Permian age, and unconsolidated terrace deposits and alluvium of Quaternary age. Their lithologic character and water-bearing properties are summarized in table 2. Gravel, clay, and gravelly clay deposits older than those beneath the terraces cap some of the higher hills in the eastern part of the area. At some places, deposits ranging from 1 to 10 feet in thickness have been quarried for use in surfacing roads. These deposits are thin, cover limited areas in widely separated places, and are not a source of ground water. Hence, although of academic interest to the geologist and geomorphologist, the gravel deposits were not mapped and will not be discussed further in this report. Pennsylvanian and older rocks occur beneath the Permian rocks, and some of the older rocks contain petroleum and natural gas of considerable economic importance. However, all those rocks contain water too salty for domestic, municipal, and most industrial uses, and for this reason they are not discussed in this report.

## PERMIAN ROCKS

The oldest rocks exposed in Cleveland and Oklahoma Counties are siltstones, sandstones, and shales of Permian age. The Permian rocks generally are called redbeds because they are predominantly red, although other colors, such as orange, maroon, purple, white, gray, and greenish gray, may be seen in exposures.

In ascending order, the Permian rocks exposed in Cleveland and Oklahoma Counties are: Wellington Formation, Garber Sandstone, Hennessey Shale, Duncan Sandstone, and Chickasha Formation. Miser (1954) mapped the Garber and Wellington as separate units north of the North Canadian River, but as a combined unit south of the river. Because of their lithologic similarity, the two formations constitute a single aquifer system. The upper sandy part of the Hennessey Shale has been called the Cedar Hills Sandstone Member in Canadian County and northwestward (Mogg, Schoff, and Reed, 1960; Miser, 1954; Fay, 1962; Ham, 1962; Bado and Jordan, 1962). The Cedar Hills Sandstone Member has not been recognized south of the North Canadian River. The Chickasha Formation and Duncan Sandstone were mapped separately in southeastern Canadian County by Armstrong (1958). Because of their small areal extent and unimportance as aquifers, these formations have been mapped as a single unit in this report.

The rocks of Permian age form roughly parallel outcrop patterns in the two counties (pl. I; Miser, 1954). In Oklahoma County

the strike of it is north-south, progressively to 35 feet of a large darko basin.

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The W exposed in C in either of overlies or beds and the lington For two formati fore have be

The cor nessey has b 1927, p. 9: easy to recog ested hills of developed or that the con northern par ogy similar shale resemb 20 or 30 fee

The Gar appearing, c which is in fine grained (written con Wellington

the strike of the rocks is nearly northward, but in Cleveland County it is north-northwestward. The exposed bedrock formations become progressively younger toward the west, and their regional dip is 30 to 35 feet per mile westward and southwestward toward the trough of a large asymmetrical syncline commonly referred to as the Anadarko basin.

Although the regional structure is that of a gently westward-dipping homocline, local irregularities reflect important structures in deeply buried rocks. With respect to ground water, the more important of these irregularities are local flexures in the Garber Sandstone and Wellington Formation in the Oklahoma City and Midwest City areas. The flexures are related to and reflect the location of the structural high beneath the Oklahoma City oil field and the structural trough in the Midwest City area (Travis, 1930).

#### GARBER SANDSTONE AND WELLINGTON FORMATION

The Garber Sandstone and Wellington Formation crop out across the eastern two-thirds of Cleveland and Oklahoma Counties in a northward-trending belt 6 to 20 miles wide. The area of outcrop is characterized by rolling, steep-sided hills that are forested with scrub oak and other small, slow-growing deciduous trees.

The Wellington Formation is the oldest of the Permian rocks exposed in Cleveland and Oklahoma Counties. Its base is not exposed in either of the counties, and the Garber Sandstone conformably overlies or grades into it. Because of the absence of fossils and key beds and the similarities of lithology, the Garber Sandstone and Wellington Formation are not readily distinguishable in the area. The two formations have similar water-bearing characteristics and therefore have been mapped as a single unit (pl. I).

The contact of the Garber Sandstone with the overlying Hennessey has been described as "apparently conformable" (Anderson, 1927, p. 9; Travis 1930, p. 11). Generally, the contact is relatively easy to recognize because it is marked by the boundary between forested hills of the Garber and the nearly smooth, grass-covered prairies developed on the Hennessey. However, close examination suggests that the contact is gradational, at least locally. In road cuts in the northern part of Oklahoma County, sandstone layers having a lithology similar to the Garber can be observed to grade laterally into shale resembling the Hennessey. Thus, in places there may be a zone 20 or 30 feet thick in which the two formations interfinger.

The Garber and Wellington consist of lenticular beds of massive-appearing, cross-bedded sandstone irregularly interbedded with shale which is in part sandy to silty. The sandstone layers are fine to very-fine grained and loosely cemented. According to C. L. Jacobsen (written communication, 1944), none of the sand in the Garber and Wellington is coarser than 0.350 mm (millimeter), and the average

diameter of the grains is 0.155 mm. The sandstone is composed almost entirely of subangular to subrounded fragments of fine-grained quartz.

Cross-bedding in the sandstone is well developed and many layers that appear to be massive are actually formed by a large number of cross-bedded units, each only a few inches thick. The cross-bedded units are typically wedge shaped, the foreset inclinations vary greatly in direction, the laminations have little upward concavity, and the foresets are relatively short. Commonly, lenticular sandstone beds terminate laterally along cross-bedded laminations. In a single exposure the inclinations of the laminae may be in several directions, and commonly they are opposed.

The sandstone is poorly cemented and it crumbles easily. The most common cement is a fine red mud, although thin discontinuous beds and irregular masses of sand have been cemented with calcite, dolomite, and barite. Sand-barite rosettes (Ham and Merritt, 1944, p. 30), fragments of fossilized wood, and small concretions and concretionary masses, composed chiefly of calcite, dolomite, barite, or hematite, have been reported from many beds. Thin discontinuous beds, layers, and stringers of dolomitic conglomerate or dolomitic sandstone occur at the base of sandstone beds in many places. Thin layers of chert conglomerate occur at the base of sandstone beds in a few places in the eastern part of the outcrop area.

In general, the sandstone content of the Garber and Wellington is greatest in northeastern Cleveland and southeastern Oklahoma Counties. In that area about 75 percent of the exposed rock is sandstone. From that area northward and southward along the strike of the beds and westward downdip, the sandstone content becomes progressively less and the proportion of shale progressively greater. Near the Canadian River in southern Cleveland County, the Garber and Wellington are about 25 percent sandstone and 75 percent shale. As the massive beds of sandstone, which are exposed in the eastern part of the area, are traced downdip and along the strike, the greatest thicknesses of sandstone occur at progressively greater depths. Individual sandstone layers range in thickness from a few inches to 50 feet or more and vary greatly in thickness in short distances. The sandstone beds range in color from nearly white to pink, orange, deep red, or purple. In many places, beds that are red or reddish brown on weathered outcrops are white or light gray in fresh exposures.

Although some sandstone beds are relatively thick, beds 5 feet or less in thickness are more common. For instance, a well drilled in 1963 for the city of Norman near SE cor. sec. 15, T. 9 N., R. 2 W., penetrated 45 sandstone beds, having an aggregate thickness of 371 feet between depths of 100 and 700 feet. These beds ranged in thickness from 1 to 30 feet, but only 4 were 20 or more feet thick, 20

ranged from 5 to 10 feet and 36 were

According to the thickness of the clay, about 350 feet at the north boundary is about 500 feet. 700 feet in the section have a total thickness

The shale beds are white to deep red. In the Wellington formation conchoidal fracture is sandy. As previously mentioned, the shale and Oklahoma County shale and silts.

The Hennessey and Oklahoma County are relatively flat, grass-covered, the valleys of inter-

The Hennessey contains layers of clayey to silty, and places along the river have weathered to

Beds of essential to 10 feet or more stratification is cross-bedded. The mass break with sharp sandstone beds occur to about 10 feet have an abundant white, gray, or light shale and siltstone from less than 1 of the formation. low, steep-sided, the area of the Garber

The Hennessey however, at most upper part of the



ranged from 5 to 20 feet, and 21 were 5 feet or less. Shale layers ranged from 1 to 40 feet in thickness, but only 3 were more than 10 feet and 36 were 5 feet or less.

According to Jacobsen (written communication, 1944), the thickness of the Garber is about 400 feet in central Cleveland County, about 350 feet in central Oklahoma County, and about 300 feet at the north boundary line of Oklahoma County. The Wellington is about 500 feet thick in the outcrop area but attains a thickness of 700 feet in the subsurface. Therefore, the two formations as a unit have a total thickness of 800 to 1,000 feet.

The shale beds of the Garber and Wellington are nonlaminated, white to deep red, and vary greatly in thickness in short distances. In the Wellington the shale is clayey and blocky and breaks with a conchoidal fracture. In the Garber the shale commonly is silty or sandy. As previously noted, the proportion of shale increases somewhat downdip toward the west. Near the west edge of Cleveland and Oklahoma Counties the Garber and Wellington are largely shale or shale and siltstone that contains little fresh water (fig. 4).

#### HENNESSEY SHALE

The Hennessey Shale covers the western one-third of Cleveland and Oklahoma Counties. Its area of outcrop is characterized by relatively flat, grass-covered prairies, largely barren of trees except along the valleys of intermittent streams.

The Hennessey consists dominantly of reddish-brown shale containing layers of siltstone and fine-grained sandstone. The shales are clayey to silty, and the siltstones contain large amounts of clay. In places along the outcrop well-indurated beds of siltstone or sandstone have weathered to form low shelflike ledges.

Beds of essentially homogeneous shale range from a few inches to 10 feet or more in thickness. Much of the shale is massive; where stratification is evident, it ranges from thinly laminated to medium bedded. The massive shales weather to form polygonal fragments and break with sharp-edged conchoidal fractures. The siltstone and sandstone beds occur in well-indurated layers ranging from a few inches to about 10 feet in thickness. Some beds of both shale and siltstone have an abundance of light-gray and gray-green spots. In outcrops, white, gray, or light-green bands occur discontinuously in beds of shale and siltstone. Lenticular beds of fine-grained sandstone, ranging from less than 1 to about 15 feet in thickness, occur near the base of the formation. In outcrop areas the thicker sandstone beds form low, steep-sided, tree-covered hills similar to the hills in the outcrop area of the Garber Sandstone.

The Hennessey Shale has a total thickness of 600 to 650 feet; however, at most places in Cleveland and Oklahoma Counties the upper part of the formation has been removed by erosion. Its thick-

ness is believed to be about 200 feet at Norman, 40 to 100 feet in the Midwest City area east of the Oklahoma City anticline, 200 to 300 feet in the Oklahoma City area, and less than 400 feet northwest of Lake Hefner.

*The Hennessey Shale as an aquifer.*—Because of its lithology the Hennessey Shale is poorly permeable; however, it is an aquifer that furnishes small quantities of water to rural domestic and stock wells.

About 90 percent of the wells are less than 80 feet deep, and most obtain their water supplies from a zone of weathered material above the relatively unaltered shale. Below the weathered zone, water is obtained from cavities left by the removal of soluble materials and from fractures.

The water from these wells is generally satisfactory in quality for domestic use but inadequate in quantity for a windmill or for a jet pump unless operated for brief periods in conjunction with a pressure tank. A few wells have been drilled to depths of 100 to 300 feet, and produce water largely from fractures or solution cavities that are recharged by downward seepage from the saturated zone in the weathered material. The water from the deep wells generally is highly mineralized and is used only for watering stock.

According to Dennis (1954, p. 14), the weathered zone in the Hennessey is an aquifer of local importance, although of small capacity and low permeability. Wells and holes tested by him showed transmissibilities ranging from 125 to about 2,500 gpd per foot. Several of the wells tested had specific capacities of the order of 1 to 2 gpm per foot of drawdown. During dry periods, however, the yields of all wells probably would decline as saturated material in the weathered zone became partly dewatered because of evaporation, transpiration, and pumping.

#### CHICKASHA FORMATION AND DUNCAN SANDSTONE

Beds of sandstone, siltstone, and shale exposed on the north side of the Canadian River in the northwest corner of Cleveland County and in the southwest corner of Oklahoma County have been referred to the Chickasha Formation and Duncan Sandstone (Armstrong, 1958). Because of their small areal extent and relative unimportance as aquifers, the Chickasha Formation and Duncan Sandstone have been mapped together for this report (pl. I). The Chickasha and Duncan, which conformably overlie the Hennessey Shale, are 150 to 200 feet thick and consist of sandstone, siltstone, siltstone conglomerate, and shale. Armstrong described the sandstone as massive, cross-bedded, fine to very fine grained, and soft to well cemented. Some of the siltstone layers are highly cross-bedded and resistant to erosion so that they make small ledges or cap low hills. All beds are lenticular and the sandstone grades laterally into siltstone or shale. The sandstone beds commonly are red orange or pink orange, but locally are brown. The shale layers generally are red.

The Chickasha value as an aquifer is not tapped by open wells. In general, the water in these places, containing some mineralized water.

The Quaternary alluvium includes terraces of the valleys of the Canadian River. The depositional character of the terraces is described in table 2.

The Quaternary alluvium, and stock water are the source of water for the needs of several valleys of the Canadian River except for two valleys along the Canadian River area along the Canadian River and Lake Overholser.

The terraces are and, because of the charge of the water, the more permeable weathered material in low areas. The terraces are more feet below the water table. The terraces are principally below the water table in the stream in the valleys to maintain the water table.

Terrace streams, which are lower levels. The terraces are made the deposits of the Canadian Rivers. The terraces are silt, clay, and gravel. The lateral distance of terrace deposition is more than the distance of the terraces.

The Chickasha and Duncan are poorly permeable and have little value as an aquifer in Cleveland and Oklahoma Counties. They are tapped by only a few small-capacity wells for domestic and stock use. In general, the water is suitable for human consumption but, in some places, contains too much dissolved gypsum or is otherwise too highly mineralized even for stock use.

#### QUATERNARY DEPOSITS

The Quaternary deposits of Cleveland and Oklahoma Counties include terrace deposits at one or more levels in, or adjacent to, the valleys of the Canadian and North Canadian Rivers, alluvium in the valleys of the principal streams, and dune sand. The areal distribution of the deposits is shown on the geologic map (pl. I), and their lithologic character and general hydrologic properties are summarized in table 2.

The Quaternary deposits supply ground water for rural, domestic, and stock purposes at many places in the two counties, and they are the source of most of the ground water used to satisfy the water needs of several small towns and unincorporated communities in the valleys of the Canadian and North Canadian Rivers. However, except for two areas along the Canadian River near Norman and an area along the North Canadian River between Oklahoma City and Lake Overholser, they have not been studied in detail.

The terrace deposits and dune sand overlie the Permian rocks and, because of their relatively high permeability, facilitate the recharge of the underlying rocks. Because the Quaternary deposits are more permeable than the Permian redbeds, springs, seeps, or "wet-weather springs" occur where the contact between the two is exposed in low areas. The alluvium generally fills valleys cut 20 to 100 or more feet below the uplands. Because of this topographic relationship, the alluvium receives some seepage from sandy units or fractured zones in the bedrock. This seepage helps to maintain a high water table in the alluvium. Water in the alluvium is discharged principally by evaporation and transpiration, but some moves downstream in the alluvial deposits, and some seeps into the stream channels to maintain flow in dry seasons.

#### TERRACE DEPOSITS

Terrace deposits consist of materials laid down by ancient streams, which, since the time of deposition, have cut valleys to lower levels. In Cleveland and Oklahoma Counties, the streams that made the deposits were ancestors of the Canadian and North Canadian Rivers. The deposits consist mostly of lenticular beds of sand, silt, clay, and gravel, which vary greatly in thickness within short lateral distances. Where they have sufficient saturated thickness, the terrace deposits yield larger quantities of water of lower mineralization than that in the Permian rocks, and, on the whole, water of

TABLE 2. GEOLOGIC UNITS EXPOSED IN CLEVELAND AND CUYAHOGA COUNTIES

System	Series	Stratigraphic Unit	Thickness (Feet)	Description and Distribution	Water-Bearing Properties
QUATERNARY	Recent	Blow sand	0-20	Fine to coarse grained wind-blown sand. Consists chiefly of subrounded quartz grains. Forms a thin mantle on hummocky surface that obscures older rocks. Most extensive deposits on north side of North Canadian River near Lake Overholser.	Moderately to highly permeable, but mostly above the water table and situated only locally. Where situated yields water readily to domestic or stock wells, but supply may not be permanent. Water most likely to occur in this unit where no decline by poorly permeable redbeds. Provides infiltration area for recharge to underlying rocks.
		Alluvium	0-70	Unconsolidated and intertonguing lenses of sand, silt, clay, and gravel in the flood plains and channels of streams.	Moderately permeable. Yields small to moderate quantities of water to wells in valleys of larger streams. Water is very hard, but suitable for most uses, unless contaminated by industrial wastes or oil-field brines.
	Pleistocene and Recent	Terrace deposits	0-100	Unconsolidated and intertonguing lenses of sand, silt, gravel, and clay that occur at one or more levels above the flood plains of the principal streams.	Moderately permeable. Locally, above the water table and not situated. Where deposits have oil-bearing saturated thickness, they are capable of yielding moderate quantities of water to wells. Water is moderately hard to very hard, but less mineralized than water in other deposits. Not suitable for most uses unless contaminated by oil-field brines.
		Chickasha Formation and Blaine Sandstone	200+	Beds of reddish-brown sandstone, siltstone, shale, and silstone, conglomerate. Individual beds of sandstone locally cross-bedded and well cemented, in western part of area between Canadian and North Canadian Rivers.	Poorly permeable. Tapped by only a few small, gravity wells for domestic or stock use. Water is hard and in places highly mineralized.
PERMIAN	Lower Permian	Hemlocky Shale	700	Dispersed clay shale containing thin beds of red sandstone and white or greenish bands of sandy or lumpy shale. Tones relatively flat to gently rolling grass-covered prairie.	Poorly permeable. Yields no quantities of water to shallow domestic or stock wells. In places water contains large amounts of sulfate.
		Garber Sandstone	400+	Dispersed to reddish-orange, massive and cross-bedded fine-grained sandstone interbedded with and intertongued with red shale and siltstone.	Poorly to moderately permeable. Important source of ground water in Cleveland and Cuyahoga Counties. Yields small to moderate quantities of water to deep wells. In areas pumped for industrial and municipal uses in the Northern and Midwest City areas. Water from shallow wells hard to very hard, water from deep wells moderately hard to soft. Lower part contains water too salty for domestic and most industrial uses.
	Upper Permian	Wellington Formation	400+	Dispersed to reddish-orange, massive and cross-bedded fine-grained sandstone irregularly interbedded with red, purple, orange, and gray shale. Base of formation not exposed in the area.	

better quality water in the terraced precipitation than

The terrace at Lake Hefner is a source of the ground water used by the city and Reed, and is used for the adjoining parts.

Logs of the terrace show a thickness of about 100 feet, a channel that cuts SW  $\frac{1}{4}$  sec. 5, T. 4 N., R. 4 W. (L. C. B.) deposits of the terrace at lateral distances of 100 to 200 feet moved by erosion.

The depth of the terrace surface. The view is from the terrace but it is likely that the terrace is properly spaced and its thickness is more than should be capable of supporting the terrace.

Other terraces on plate I, have not been known for a long time, large-capacity terraces are known.

Terrace deposits of the Canadian River area near Norman are not known by the U. S. Geological Survey, little known.

According to Norman coring at depths generally 100 to 200 feet and that the sites, wells that are capable of producing

The modern Canadian, North

better quality than that in the alluvium. Replenishment of ground water in the terrace deposits comes mainly from infiltration of precipitation that falls on the terrace surface.

The terrace deposit on the upland between Lake Overholser and Lake Hefner (pl. I), known locally as the Bethany terrace, is the source of the ground water pumped by the city of Bethany (Jacobsen and Reed, 1949). The deposit also supplies water to many shallow wells used for residential gardening in Bethany, Warr Acres, and adjoining parts of Oklahoma City.

Logs of test holes drilled for the Bethany and Oklahoma City Water Departments indicate that the terrace deposit has a maximum thickness of about 80 feet and that it is thickest over a buried stream channel that curves southward through the central part of sec. 6, SW $\frac{1}{4}$  sec. 5, western part of sec. 8, and SE $\frac{1}{4}$  sec. 7, T. 12 N., R. 4 W. (L. C. Burton, written communication, 1958). Elsewhere, the deposits of the Bethany terrace vary greatly in thickness over short lateral distances, according to the configuration of the buried bedrock surface (Hennessey Shale) and the amount of terrace material removed by erosion.

The depth to water generally is less than 30 feet below land surface. The yields of wells tapping the terrace deposits are not known, but it is likely that, where the saturated thickness is at least 5 feet, properly spaced wells would yield 5 to 10 gpm. Where the saturated thickness is more than 50 feet, properly spaced and developed wells should be capable of sustained yields of 100 to more than 200 gpm.

Other terrace deposits that occur in Oklahoma County, as shown on plate I, have not been studied by the U. S. Geological Survey and are not known to have been tested as a source of ground water for large-capacity wells; hence, their ground-water potential is not known.

Terrace deposits also were mapped along the upland bordering the Canadian River in Cleveland County. However, except for an area near Norman (Stacy, 1961), the deposits have not been studied by the U. S. Geological Survey and their ground-water potential is little known.

According to Stacy (1961), the terrace deposits in the vicinity of Norman contain considerable quantities of water of good quality at depths generally less than 50 feet below land surface. The logs of test holes indicate that the deposits range from 40 to 95 feet in thickness and that their saturated thickness averages 40 feet. At favorable sites, wells that are properly constructed and developed should be capable of producing as much as 200 gpm.

#### ALLUVIUM

The modern channels, flood plains, and low terraces along the Canadian, North Canadian, and Little Rivers and their major tribu-

Exposed to weathering, generally in the form of a thin layer of ground water in the soil and in the underlying bedrock. Yields are not known. The deposits are not tested as a source of ground water for large-capacity wells; hence, their ground-water potential is not known.

Exposed to weathering, generally in the form of a thin layer of ground water in the soil and in the underlying bedrock. Yields are not known. The deposits are not tested as a source of ground water for large-capacity wells; hence, their ground-water potential is not known.

200

200

1

100

100

taries are covered with alluvium (pl. I). These deposits represent the present cycle of erosion and deposition, and the deposits are still being formed, eroded, and reworked. The flood plains generally are 5 to 10 feet lower than the surface of the adjacent low terraces, and the stream channels are cut as much as 3 or more feet into the flood plains.

Along the Canadian and North Canadian Rivers the alluvium is a band averaging about 2 miles in width, but at Ten-Mile Flat on the Canadian, about 5 miles northwest of Norman, and at Oklahoma City, on the North Canadian, it is more than 3 miles wide. The Canadian River has a sandy shifting channel 1,000 to 6,000 feet wide. Phreatophytes, such as marsh grass, cattails, and willow and cottonwood trees, are common along the channel and on the flood plain in many places.

The alluvium consists mostly of lenticular beds of sand, silt, and clay. It probably also contains some lenticular beds and stringers of gravel and gravelly sand in the lower part. The alluvium ranges in thickness from a few inches to about 90 feet. Thicknesses are greater only where the present stream alluvium is underlain by older alluvium that fills channels cut into the bedrock and commonly referred to as buried stream channels.

The alluvium in the North Canadian River valley in Canadian County has been studied intensively by Mogg, Schoff, and Reed (1960). They showed that these deposits are as much as 60 feet thick in places and contain permeable sand and gravel capable of yielding several hundred gallons of water per minute to wells. These deposits probably have similar properties in the western part of Oklahoma County, where they supply water to numerous industrial wells and to emergency-supply wells drilled by Oklahoma City (table 3).

At Ten-Mile Flat on the Canadian River the alluvium has a maximum thickness of about 70 feet. The alluvium is thickest over a buried stream channel that approximately parallels the eastern margin of the flat in secs. 4, 5, 9, 16, 21, 28, 33, T. 9 N., R. 3 W. Information obtained from the logs of 32 test holes drilled by the U. S. Navy and the logs of many geophysical shotholes furnished by the Carter Oil Company indicate that throughout much of its length the buried channel was 1,000 to 2,000 feet wide, that it was cut 25 or more feet below the bedrock surface in other parts of the flat, and that its base was 110 to 140 feet below the upland surface immediately to the east (Jacobsen and Reed, written communication, 1943).

The data collected by Jacobsen and Reed indicate that along the buried stream channel the alluvium may average 60 feet in thickness, and that in other parts of the flat it may range in thickness from 20 to about 40 feet.

The depth to water in 1943 was about 10 feet below land sur-

## HYDROLOGY OF THE GARBER SANDSTONE AND WELLINGTON FORMATION

The Garber Sandstone and Wellington Formation constitute the most important source of ground water in Cleveland and Oklahoma Counties. The cities of Edmond, Nichols Hills, Del City, Midwest City, Moore, and Norman, and many small towns obtain all their water supplies from wells completed in one or both of the formations.\* Tinker Air Force Base, a major service facility in the national-defense establishment, The University of Oklahoma, Central State Griffin Memorial Hospital, and many commercial and industrial firms also obtain their water supplies from wells tapping one or both formations. Oklahoma City and several commercial and industrial establishments in the city have wells in one or both formations. Since the 1951-1956 drought, the Oklahoma City wells and many of the commercial wells have been little used, but they are maintained on a standby basis.

The Garber and Wellington constitute a single aquifer, or water-bearing zone. The two formations were deposited under similar conditions, and both consist of lenticular beds of sandstone, siltstone, and shale that may vary greatly in thickness within short lateral distances. Wells drilled into the water-bearing zone may tap individual beds of sandstone as much as 50 feet thick and may penetrate as much as 200 to 300 feet of water-bearing sandstone. Other wells drilled nearby may tap only a few relatively thin beds of sandstone and may penetrate less than 100 feet of water-bearing material.

### THICKNESS OF THE FRESH-WATER ZONE

Wells obtain fresh water from the Garber and Wellington at depths of 100 feet or less in the areas of outcrop and at maximum depths of about 1,000 feet in the structural depression in the Midwest City area. The maximum depth at which wells obtain potable water supplies is controlled by the depth at which salt water is encountered in these formations (fig. 4). The contact between the fresh water and salt water probably is not abrupt because an intermediate brackish-water zone has been found in some wells. Where such brackish water is encountered, the wells commonly are plugged back and completed in a higher water-bearing zone.

The approximate depths below land surface of the base of the fresh-water body in different parts of the area are as follows: near

\* Since completion of this report, the Lake Thunderbird reservoir has been completed, and Norman now derives all public water supplies from this source, maintaining the old wells on a standby basis. Del City and Midwest City fulfill their needs from both the reservoir and wells.

Canadian River in southeastern Cleveland County, 100 feet; Noble, 400 feet; Norman, 700 feet; Moore, 850 feet; Southwest corner Oklahoma County, 1,000 feet; Harrah, 300 feet; Choctaw, 640 feet; Midwest City, 1,000 feet; Oklahoma City-Lake Hefner area, 800 feet; Edmond, 700 feet; and Luther, 200 feet.

Figure 4 is a contour map of the base of the fresh-water body. The base was determined from electric logs of oil and gas wells, drillers' logs, and chemical analyses of water samples obtained from water wells. The bottom of the lowermost fresh-water sandstone at any location was assumed to be the base of the fresh-water section. However, if that sandstone grades laterally into shale, the next higher sandstone that would have been chosen as the base of the fresh-water body in an adjacent well may be several tens of feet higher.

In general, the base of the fresh-water body in the two counties has the shape of an elongate westward-tilted trough, trending slightly west of north and parallel to the regional strike of the geologic formations. In most places the base of the fresh-water body dips westward at rates ranging from 10 to 20 feet per mile. The steep rise, or gradient, which extends northward along the west side of the two counties from a point near Norman, probably represents the limit to which salt water has been flushed from individual sandstone beds in the Garber Sandstone and Wellington Formation. Although the contact between fresh and salt water is represented as a sharply defined one, there is probably a transition zone in which fresh water gradually grades into salt water.

The contours on the base of the fresh-water body reflect some structural features in the Garber and Wellington. Thus, the greatest depth of fresh water corresponds to the Midwest City depression and the shallower depth of fresh water southeast of Oklahoma City corresponds to the Oklahoma City anticline. However, the steep rise in the slope of the contact between the fresh water and the salt water at the west edge of the map is unrelated to rock structure and may reflect a change of facies from coarser to finer sediments.

Two cross sections (figs. 5, 6) illustrate the lensing and interfingering of sandstone, shale, and silty beds in short lateral distances and show the approximate base of the fresh-water body as determined from figure 4. Section A-A' (fig. 5) is a small-scale electric-log section drawn from east to west across the Oklahoma City area, following roughly the direction of dip. The section shows the lenticular character of the individual beds and lithologic units that makes it difficult or impossible to correlate such units from well to well. However, the approximate base of the fresh-water body is indicated on the section.

Section B-B' (fig. 6) is a detailed lithologic section based upon

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Figure 4. Map showing the base of fresh ground water in Cleveland and Oklahoma Counties. Cross section A-A' is shown in figure 5.



## **REFERENCE 12**

**RECORD OF  
COMMUNICATION**

☒

Phone Call

☐

Discussion

☐

Field  
Trip

☐

Conference

☐

Other (Specify)

**REF. 12**

TO: Bob Thomas  
Hydrogeologist  
Groundwater Division

FROM: Heather Schijf  
ICF Technology

DATE: 10-21-88

Oklahoma Water Resources  
Board (405) 271-2575

FIT Biologist  
(214) 744-1641

TIME: 1:00 pm

SUBJECT: Groundwater Below The Wiley Post Airport

**SUMMARY OF COMMUNICATION:**

I called to ask Mr. Thomas if the Hennessey shale acted as a confining layer. He said that it did but it was a confining layer to the Garber Wellington. He proceeded to explain the usable water layers. The following is a summary of that explanation. He said that the majority of the water for private and municipal wells for the immediate vicinity of the Wiley Post Airport is obtained from the terrace deposits which lay above the alluvial deposits. The alluvial deposits lay above the Garber Wellington. There is not a distinct separating layer between the terrace deposits and the alluvium. The Hennessey shale is interspersed in this area just above the Garber Wellington. In this area, the Garber Wellington consists of interspersed lenses of sandstone and clay. Because of this, it is hit or miss in obtaining water from the Garber Wellington. A confining layer is not present between the surface and the terrace deposits and alluvium. Recharge for these water bearing units (terrace/alluvium), if from surface percolation, of precipitation and is therefore the cleanest source of drinking water. Mr. Thomas said that the deeper the water is obtained, the worse the water quality is.

**CONCLUSIONS, ACTION TAKEN OR REQUIRED:**

**INFORMATION COPIES TO:**

EPA FORM 1300-6 (7-72)

Replaces EPA HQ Form 5300-3 Which May Be Used Until Supply is Exhausted.

## **REFERENCE 13**

# MITRE

26 May 1988  
252-1114

Ms. Lucy Sibold  
U.S. Environmental Protection Agency  
401 M Street, S.W.  
Room 2636, Mail Code WH-548A  
Washington, D.C. 20460

Dear Ms. Sibold:

Enclosed is a copy of the draft revised HRS net precipitation values for 3,345 weather stations where data were available. The data are presented by state code, station name, latitude longitude, and net precipitation in inches. A list of state codes is also enclosed.

The net precipitation values are provided to assist the Phase II - Field Testing efforts. It is suggested that the value from the nearest weather station in a similar geographic setting be used as the net precipitation value for a site.

If there are any questions regarding this material, please contact Dave Egan at (703) 883-7866.

Sincerely,



Andrew M. Platt  
Group Leader  
Hazardous Waste Systems

AMP:DEE/hme

Enclosures

cc: Scott Parrish

OBS	STATE	NAME	LATNUM	LONGNUM	NETPREC
2201	33	OBRIEN	41.18	82.13	13.0125
2202	33	ITHAM	41.19	81.09	18.5179
2203	33	ELYRIA 3 E	41.23	82.04	13.8848
2204	33	BOWLING GREEN SWG PL	41.23	83.38	11.5001
2205	33	NAPOLEON WATER WORKS	41.23	84.08	13.3265
2206	33	CLEVELAND WSO //R	41.25	81.52	14.5957
2207	33	SANDUSKY R	41.27	82.43	12.2687
2208	33	MAUSION WASTE WTR PLT	41.33	84.08	14.0496
2209	33	CHARDON	41.35	81.13	22.4792
2210	33	TOLEDO EXPRESS WSO R	41.35	83.48	12.3882
2211	33	MONTPELIER 1 WSW	41.35	84.34	12.8773
2212	33	PUT IN BAY PERRY MUN	41.39	82.48	11.3873
2213	33	TOLEDO BLADE	41.39	83.32	12.2873
2214	33	PAINESVILLE 4 NW	41.45	81.18	14.6371
2215	33	ASHTABULA	41.51	80.48	16.0639
2216	34	IDABEL	33.53	94.49	20.2482
2217	34	MARIETTA 3 NW	33.59	97.07	8.7602
2218	34	HUGO	34.01	95.30	16.8022
2219	34	MADILL	34.05	96.46	11.6889
2220	34	ARDMORE	34.10	97.08	8.3155
2221	34	MAURIKA	34.10	98.00	5.3553
2222	34	ANTLERS 2 ENE	34.15	95.36	18.1750
2223	34	WALTERS	34.21	98.19	6.4415
2224	34	FREDERICK	34.24	99.01	3.2794
2225	34	TIPTON 4 S	34.26	99.08	3.0716
2226	34	CHATTANOUGA 3 NE	34.27	98.37	4.2411
2227	34	DUNCAN	34.30	97.57	6.3316
2228	34	ALTUS IRR. RESCH SIN	34.35	99.20	2.3477
2229	34	LAWTON	34.37	98.27	6.0852
2230	34	HOLLIS	34.41	99.55	1.4067
2231	34	WICHITA MI WL REF	34.44	98.43	5.5193
2232	34	PAULS VALLEY	34.45	97.13	9.1892
2233	34	ADA	34.47	96.41	11.6617
2234	34	HANGUM RESEARCH STA	34.50	99.26	2.1961
2235	34	MCALISTER FAA AIRPORT	34.53	95.47	15.9778
2236	34	VISTER DAM	34.56	94.43	16.1714
2237	34	WILBURN 9 ENE	34.56	95.09	17.8935
2238	34	PURCELL	35.00	97.22	9.3220
2239	34	HODART FAA AIRPORT	35.00	99.03	3.5027
2240	34	CHICKASHA EXP STATION	35.03	97.55	5.4221
2241	34	POTEAU	35.04	94.38	17.2077
2242	34	ANADARKO	35.04	98.14	5.1966
2243	34	HOLDENVILLE	35.05	96.24	11.6238
2244	34	CARNEGIE 4 ENE	35.08	98.33	4.3843
2245	34	TRICK 4 E	35.12	99.48	2.3813
2246	34	SEMINOLE	35.14	96.40	9.6861
2247	34	OKLAHOMA CITY WSO //R	35.24	97.36	7.0937
2248	34	OKEMAH	35.26	96.18	10.0193
2249	34	SALLISAW	35.28	94.47	15.7433
2250	34	METKER 1 E	35.30	96.53	8.9983
2251	34	WEBBENS FALLS	35.31	95.08	15.2686
2252	34	CLINTON	35.31	98.58	4.8464
2253	34	WEATHERFORD	35.32	98.42	4.0004
2254	34	EL RINO 1 N	35.33	97.58	5.9158
2255	34	OKMUGIL WATER WORKS	35.37	96.01	11.6742

## **REFERENCE 14**

## RECORD OF COMMUNICATION


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TYPE: Telephone Call

DATE: 6-28-91

TIME: 4:00 p.m.

TO: Craig Davis  
City of Bethany Water  
Department  
Bethany, Oklahoma  
405-789-1421

FROM: Kevin Jaynes   
FIT Biologist  
ICF Technology, Inc.  
Dallas, Texas  
214-744-1641

SUBJECT: Wells Locations

### SUMMARY OF COMMUNICATION

Well G-3 is currently inactive due to pump problems.

The Garber wells G-1 and G-2 are not treated or pooled but are chlorinated and pumped into the system.

Well No. 16 is now used by the Tri-City ball park for watering and sprinkler systems. It is located just 300 feet south of Well No.18. Actually only 27 wells are active including G-3 when it goes on line again.

## **REFERENCE 15**




## RECORD OF COMMUNICATION

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TYPE: Telephone Call

DATE: 6-6-91

TIME: 2:45 p.m.

TO: Kevin Jaynes   
FIT Biologist  
ICF Technology, Inc.  
Dallas, Texas  
214-744-1641

FROM: Dan Bridgeforth  
Superintendent  
City of Bethany  
Bethany, Oklahoma  
405-789-0920

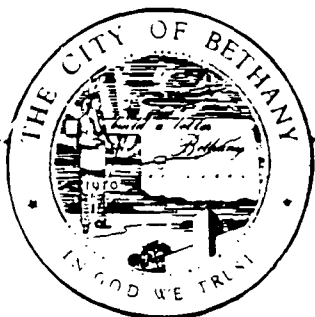
SUBJECT: Active Wells in Bethany, Ok. and Update of Previously Obtained Information.

### SUMMARY OF COMMUNICATION

Mr. Bridgeforth explained that there are currently 25 wells pumping from the alluvium and terrace deposits and 3 wells pumping from the Garber. The alluvium wells are pumped to the water plant pooled and treated for hardness.

Wells No. 3, 4, 11, 14 and 15 are no longer used. I explained to Mr. Bridgeforth about the map I had from the Air Center, Inc. site. He said that it is still good and the locations are the same.

## **REFERENCE 16**



## CITY OF BETHANY

6700 N. W. 36th Street  
P. O. Box 219  
Bethany, OK 73008  
(405) 789-2146

Heather Schijf  
ICS Technology  
1509 Main Street, Ste. 900  
Dallas, Texas  
75201

Heather-

Enclosed is some of the material I have on our wells. The information on our older wellfields is more extensive than the material on our newer wells. If there is anything more we can provide you with, please let us know. We have good drawdown records, as well as records on treated water quality and quantities pumped.

If you need to call me, the best time is at 8:00 AM at the Water Shop.  
Sincerely,

Dan Bridgforth  
Utilities Supt.



**DAN BRIDGFORTH**  
Utilities Superintendent

P.O. BOX 219  
6700 N.W. 36TH  
BETHANY, OKLA. 73008  
(405) 789-2146

PLANT  
789-1421  
SHOP  
789-0920

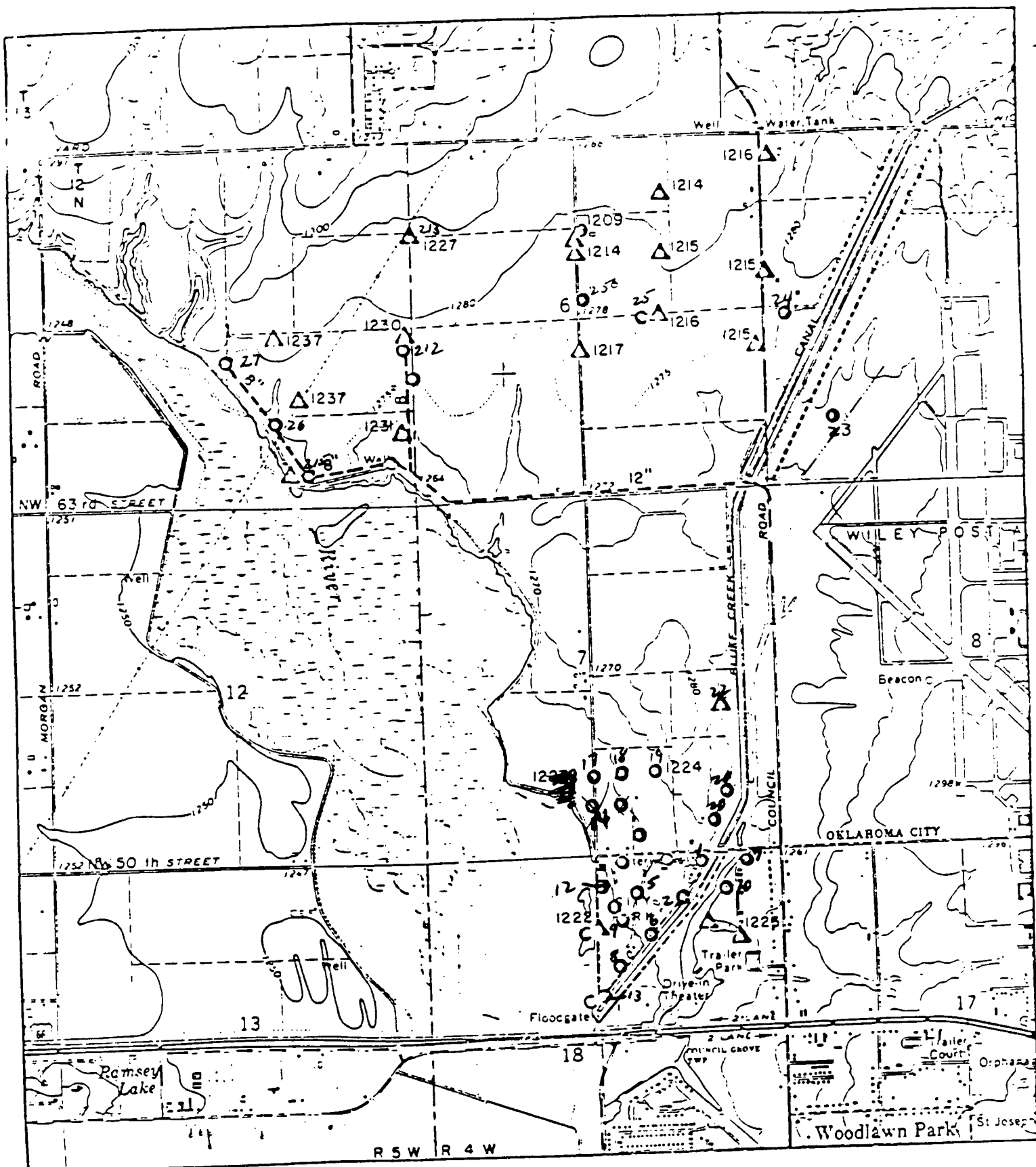
TABLE 3 - WATER QUALITY (mg/l)

Source		pH	M. Alkalinity	Chloride	Sulphate	Total Hardness	Calcium	Magnesium	Dissolved Solids	Iron	Manganese	Nitrate
Upper Recommended Limit <sup>1</sup>		--	--	250	350	--	--	125	500	0.3	0.05	45
Bethany Wells	Well #1	7.0	372	117	150	440	150	15.6	902	<0.25	<0.025	0.3
	Well #2	6.9	184	117	160	308	91	19.2	616	0.21	0.025	1.2
	Well #3	7.1	264	146	185	416	135	18.7	842	<0.25	<0.025	0.4
	Well #4	7.1	276	197	200	400	150	6.0	1,012	0.25	2.18	0.2
	Well #5	7.1	322	199	255	528	177	20.4	1,098	<0.25	1.45	0.1
	Well #6	7.1	274	181	202	424	150	11.8	959	0.25	1.35	0.1
	Well #7	7.1	166	53	109	228	74	10.3	469	<0.25	<0.025	2.5
	Well #8	7.2	224	153	172	324	105	14.6	831	<0.25	1.75	0.1
	Well #9	7.3	262	163	192	368	122	15.1	912	<0.25	1.75	0.1
	Well #10	6.9	192	75	172	312	102	13.7	677	<0.25	<0.025	5.0
	Well #12	7.2	322	191	205	472	150	23.3	1,083	0.5	2.25	0.1
	Well #13	7.2	283	177	182	400	145	8.9	998	0.25	2.25	0.2
	Well #14	7.2	266	190	195	404	132	17.8	979	0.25	3.2	0.1
	Well #15	7.2	248	168	180	420	127	24.3	811	0.25	0.05	1.0
	Well #16	7.3	254	175	200	404	150	7.0	949	0.25	<0.025	0.1
	Well #17	7.1	326	198	255	424	152	10.6	1,131	0.4	0.92	0.1
	Well #18	7.1	336	171	205	512	190	8.9	1,046	0.25	<0.025	0.1
	Well #19	7.1	438	164	200	592	220	10.1	1,059	0.4	<0.025	0.1
	Well #20	7.2	324	101	150	364	125	12.2	740	0.25	<0.025	0.8
	Well #21	7.2	264	67	110	283	100	9.1	605	0.25	<0.025	0.75
Oklahoma City Wells	Well #209	7.1	318	195	200	452	158	13.7	991	0.25	2.4	0.4
	Well #210	7.1	218	163	160	380	110	25.2	802	0.5	1.45	0.5
	Well #211	7.2	268	202	200	424	148	13.3	977	0.75	2.8	0.1
	Well #212	7.3	234	58	41	260	88	9.1	405	0.5	<0.025	0.3
	Well #213	7.2	252	9	14	200	70	6.0	238	0.25	<0.025	0.1
	Well #214	7.2	234	102	81	304	115	4.0	500	0.25	<0.025	0.2
	Well #215	7.2	280	153	100	408	145	10.9	711	0.75	<0.025	0.1
Raw Water <sup>2</sup>		(7.12)	302	184		508	364	144	940	0.25	1.25	( ) <sup>3</sup>
Treated Water <sup>2</sup>		(9.27)	58	182		126	54	72	617	<0.25	0.025	( ) <sup>3</sup>

<sup>1</sup>Upper Recommended Limit by U. S. Public Health Service and Oklahoma State Health Department.

<sup>2</sup>Blended water from all Bethany wells.

<sup>3</sup>( ) Analyses by Midco Laboratory.



# LEGEND

- Existing Production Well
- Proposed Production Well
- △ 8" Monitoring Well
- - - New Pipe Line Required
- 1223 Measured Water Table Elevation(1978)

*Well locations*



Scale: 1" = 2000'

ENGINEERING  
Enterprises, Inc.

FIGURE

TABLE 1 - WELL DATA &amp; PERFORMANCE SUMMARY

Well #	41 1	42 2	43 3	44 4	45 5	46 6	47 7
Well Depth (from pump base).	65	68.8	68	65	67.4	65	62.9
Elevation, pump base. <sup>1</sup>	1261.5	1257.4	1259.2	1258.5	1257.2	1254.2	1255.8
Elev. top of dd tube.	1260.6	1256.4	1259.6	1260.8	1256.3	1254.8	1255.3
Maximum desirable pumping depth.	50	53	50	52	50	47	47
Maximum historical pumping level in dd tube.	62	50	60	55	52	47	58
Correction from dd tube to casing pumping level.	--	2.0	0.3	5.0	0.5	0	0.2
Total depth of historical pumping level in casing (L. 5+6).	62+	52	60.3	60	52.5	47	58.2
Elev. total historical pumping level (L. 2-7).	1199.5	1205.4	1198.9	1198.5	1204.7	1207.2	1197.6
Elev. Bottom of well.	1196.5	1188.6	1191.2	1193.5	1189.8	1189.2	1192.9
Historical height of water above well bottom (L. 8-9).	3.0	16.8	7.7	5.0	14.9	18.0	4.7
Desirable height of water above well bottom (L. 1-4).	15	15	15	15	15	15	15
Pumping level above (+) or below (-) desired level.	-12	+1.8	-7.3	-10	- 0.1	+3.0	-9.3
Specific Capacity(gpm/ft)	?	18.8	11.2	9.3	28.0	19.5	7.6
Recommended addition (+) or reduction (-) in well output in gpm.	?	+34	-82	-93	-3	+59	-71

<sup>1</sup>From Davila's 1968 "Comprehensive Report of the Bethany Water System".

TABLE 1 - WELL DATA & PERFORMANCE SUMMARY

Well #	48	49	50	51	52	53	54
	8	9	10	12	13	14 cut	15 cut
Well Depth (from pump base).	61.6	63.5	59.4	61.6	56.1	65.9	68.5
Elevation, pump base. <sup>1</sup>	1247.5	1250.4	1254.3	1249.2	1247.2	1254.8	1259
Elev. top of dd tube.	None	None	1253.7	None	1246.9	1253.7	1258.5
Maximum desirable pumping depth.	47	48	44	47	41	50	53
Maximum historical pumping level in dd tube.	--	46	53	--	38	43	54
Correction from dd tube to casing pumping level.	--	--	0.4	--	5.0	17.6	4.0
Total depth of historical pumping level in casing (L. 5+6).	?	46	53.4	?	43	59.6	58
Elev. total historical pumping level (L. 2-7).	--	1204.4	1200.9	--	1204.2	1195.2	1201
Elev. Bottom of well.	1185.9	1186.9	1194.9	1187.6	1191.1	1188.8	1190.5
Historical height of water above well bottom (L. 8-9).	--	17.5	6.0	--	13.1	6.4	10.5
Desirable height of water above well bottom (L. 1-4).	15	15	15	15	15	15	15
Pumping level above (+) or below (-) desired level.	?	+2.5	-9.0	?	-1.9	-8.6	-4.5
Specific Capacity(gpm/ft)	15.4	16.4	10.0	11.4	15.8	6.1	4.2
Recommended addition (+) or reduction (-) in well output in gpm.	?	+41	-90	?	-30	-52	-19

<sup>1</sup>From Davila's 1968 "Comprehensive Report of the Bethany Water System".

TABLE 1 - WELL DATA & PERFORMANCE SUMMARY

Well #	55	56	57	58	59	60
	16	17	18	19	20	21
Well Depth (from pump base).	<i>No longer used for drinking</i> 66.6	71.5	77.6	86.6	70.6	70.5
Elevation, pump base. <sup>1</sup>	1257.3	1256.9	1260.2	1267.4	1257.5	1258.2
Elev. top of dd tube.	1256.9	None	None	None	None	None
Maximum desirable pumping depth.	52	56	63	72	56	55
Maximum historical pumping level in dd tube.	55	--	65	74	58	62
Correction from dd tube to casing pumping level.	5.0	--	0	0	0	0
Total depth of historical pumping level in casing (L. 5+6).	60	?	65	74	58	62
Elev. total historical pumping level (L. 2-7).	1196.7	--	1195.2	1193.4	1199.5	1196.2
Elev. Bottom of well.	1188.7	1185.4	1182.6	1180.8	1186.9	1187.7
Historical height of water above well bottom (L. 8-9).	8.0	--	12.6	12.6	12.6	8.5
Desirable height of water above well bottom (L. 1-4).	15	15	15	15	15	15
Pumping level above (+) or below (-) desired level.	-7	?	-2.4	-2.4	-2.4	-6.5
Specific Capacity(gpm/ft)	4.8	6.0	8.5	5.2	20.6	11.2
Recommended addition (+) or reduction (-) in well output in gpm.	-34	?	-20	-12	-50	-73

<sup>1</sup>From Davila's 1968 "Comprehensive Report of the Bethany Water System".

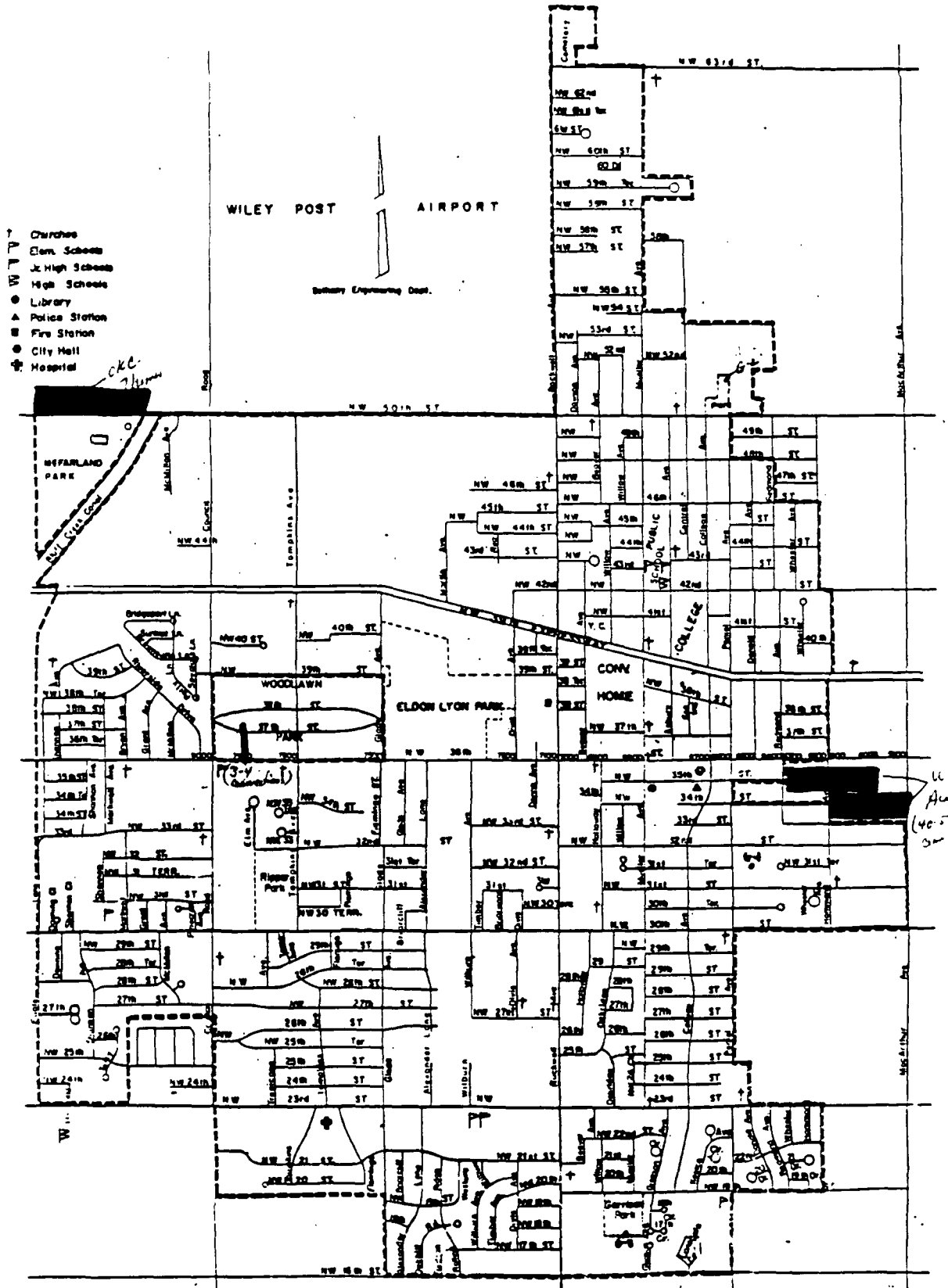


Well #	Well	GPM	Static	Pumping
61	22	47	24.0	30.0
62	23	250	42.2	48.0
63	24	200	64.2	77.9
64	25	200	64.3	80.3
65	26	290	17.4	27.5
66	27	310	21.0	32.5
67	212	200	61.0	74.7
68	213	300	65.4	80.1
69	215	250	24.9	47.5
70	G-1	300	496.2	504.2
71	G-2	300*	450*	*
72	G-3	300*	450*	*

\* Proposed Wells, Under Construction

# STREET MAP OF BETHANY, OKLAHOMA

1984  
Scale: 1"=1000'



## **REFERENCE 17**

RECORD OF  
COMMUNICATION

☒ Phone Call ☐ Discussion ☐ Field Trip  
☐ Conference ☐ Other(Specify)

(Record of Item Checked Above)

FROM: H.S.

Heather Schijf/ICF  
Technology

DATE

04/16/87

TIME

8:15 AM - 8:30 AM

TO:

Dan Bridgeforth  
Utility Superinten-  
dent Bethany Water  
Dept. OK 405/789-0920

SUBJECT

Water Source

SUMMARY OF COMMUNICATION

The city of Bethany water is supplied by 25 wells which draw from the North Canadian alluvial terrace that have a depth of 45-100 ft. Static water level depends on the depth of wells. This water from the North Canadian is sent through the water treatment system before used for drinking water. The city also has one well that draws from the Garber-Wellington Aquifer that has a depth of 822 ft and reaches static water at 496 ft. Approximately 26000 people are served by this system. The Garber-Wellington is not sent through the treatment system. Chlorine is all that is added. Oklahoma City is supplied by 3 reserviors, Lake Hefner and Lake Overholser (source is Lake Canton via the North Canadian River. Draper Reservoir source is the Lake Atoka via the Atoka pipe line approx. 450,000 people are served. Woodlake pond is located in Woodlake subdivision and is classifed for recreational use light boating and some fishing - possibly no swimming, sending map of well locations. Called 4/21/87 8:30 am. Asked him to send a map showing the service boundries of Bethany. The water is pooled/mixed after coming out of wells before treatment system.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES

TO:

## **REFERENCE 18**

**RECORD OF  
COMMUNICATION**

☒ Phone Call ☐ Discussion ☐ Field Trip  
☐ Conference ☐ Other (Specify)

TO: Mr. Craig Davis  
Bethany Water Plant  
  
(405) 789-1421

FROM: Heather Schijf  
ICF Technology  
  
FIT Biologist  
(214) 744-1641

DATE: 10-21-88  
  
TIME: 4:21 pm

SUBJECT: Alternate Source Of Drinking Water

**SUMMARY OF COMMUNICATION:**

I asked Mr. Davis if the City of Bethany had an alternate source of drinking water or was groundwater the only source. He said that groundwater was the only source and that they did not have an alternate source.

**CONCLUSIONS, ACTION TAKEN OR REQUIRED:**

**INFORMATION COPIES TO:**

## **REFERENCE 19**

RECORD OF  
COMMUNICATION

☒ Phone Call ☐ Discussion ☐ Field Trip  
☐ Conference ☐ Other(Specify)

(Record of Item Checked Above)

TO: City of Warr Acres  
405/789-2892

FROM: Ravinder Joseph  
ICF Technology

DATE  
05/29/87  
TIME  
15:00

SUBJECT  
Air Center - Well Information

SUMMARY OF COMMUNICATION

There is no water department in the city. The water is supplied by the Okla-  
homa City.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES

TO:



## **REFERENCE 20**



## ICF TECHNOLOGY, INCORPORATED

To: Ed Sierra, Region VI RPO  
Thru: K.H. Malone Jr., FITOM  
Thru: Tim Hall, ICF AFITOM *HS* *TAH*  
From: Heather Schijf, FIT Biologist  
Date: January 10, 1989

Subject: Sampling results for samples collected from the Community of Silver Lake municipal wells located near the Air Center Inc. site. TDD # F-6-8810-10, CERCLIS # OKD980750319, E&E Pan # FOK0270SDF.

The Air Center site is an inactive, abandoned aircraft renovation and paint stripping facility, that ceased operations in March of 1984. Waste generated from the stripping process was allowed to discharge into an unlined lagoon that drained into a drainage ditch, which in turn flowed into a residential pond. Also present on site are two underground storage tanks which were used to hold stripped paint sludge. At closure, the unlined lagoon was filled in and the underground storage tanks pumped dry. Currently, the site is leased by Commander Aircraft for use as paint hangars.

Past sediment sampling by the Oklahoma Water Resources Board and by the Oklahoma Department of Health indicated elevated levels (above background) of cyanide, lead, chromium, phenol and zinc. Further sampling by the EPA-FIT in January of 1988 indicated the presence of phenol and cyanide in both on-site and off-site soil and water samples, and elevated levels of lead in the City of Bethany drinking water wells. Resampling of the Bethany wells indicated low levels of lead in only one of the city wells.

On November 7, 1988, as a result of a citizens complaint, FIT team members, Heather Schijf (team leader), and Chriss Pitre (site safety officer) collected samples from municipal wells which provide drinking water to the Community of Silver Lake. The Community of Silver Lake is located approximately 2.1 miles northeast of the Air Center site. A copy of the USGS map is attached. The Silver Lake water system has two wells (labeled north well and south well) and a water tower which serves a total of 85 families or approximately 323 people. According to the State Health Department, the well water

contains naturally high levels of arsenic, chromium, and selenium. In order to lower the elevated levels of contaminants, the well water is mixed with 20% treated Oklahoma City water (see Attachment A). The treated city water is transported to the water tower via pipes and then mixed with the untreated well water. The wells are sampled every three years by the State Health Department (see Attachment B for copies of the past analysis performed by the State). According to the well operator, the north well produces softer water than the south well. The November 1988 sample results confirm this. Furthermore, the US Geological Survey Water Resources Division in Oklahoma City is currently conducting an extensive study of the Garber-Wellington Aquifer (see Attachment C for analysis of samples collected by the USGS). While published results of the study are not yet available, preliminary analysis of other municipal wells drawing from the Garber-Wellington indicate that elevated levels of naturally occurring trace elements is a common problem in central Oklahoma (see Attachment D). These trace elements include arsenic, chromium, and selenium. The well log for the Silver Lake wells indicates that layers of shale are interspersed throughout the depth of the well (see Attachment E).

The wells are located in the Community of Silver Lake on Harbor Drive (see Attachment F). Sample 1 was collected from the north well, Samples 2 and 2d were collected from the south well, and Sample 3 was the trip blank of deionized water collected at the E&E warehouse located in Dallas, TX. Sample 2d is a duplicate of sample 2. Samples 1, 2, and 2d were collected from taps at the well head directly into sample bottles. Sample 3 was also collected directly into sample bottles. All four samples were shipped to the EPA Houston Laboratory for full RAS analysis, on November 7, 1988, via Federal Express. Copies of the chain of custody and receipt for samples are attached as Attachment G. Table 1 indicates field measurements taken at the time of sample collection. Table 2 indicates contaminant levels and Primary Drinking Water Standards (see Attachment H for a complete copy of the sample results).

Table 1

Field Measurements

<u>Sample</u>	<u>Well</u>	<u>pH</u>	<u>Cond.</u>	<u>Temp.</u>
1	North	7.67	390 umhos/cm	20°C
2	South	7.04	800 umhos/cm	17°C
2d	South (dup)	"	"	"
3	Trip blank	N/A	N/A	N/A

Table 2

	<u>DW</u> <u>Stand.</u>	<u>North</u> <u>Well</u>	<u>South</u> <u>Well</u>	<u>South</u> <u>Well (dup)</u>	<u>Trip</u> <u>Blank</u>
Arsenic	50*	51.8	16.1	16.1	ND**
Chromium	50	57	60	53	ND
Selenium	10	11.7	48.9	50.5	ND

\* all concentrations in ppb

\*\* ND = not detected

Inorganic analysis of the November 1988 samples indicates the presence of arsenic, chromium, and selenium at levels above the Primary Drinking Water Standards. The organic analysis did not indicate contaminant levels above the detection limit. Chromium is the only contaminant detected that could be remotely attributable to the Air Center site. This reasoning is based on the detection of chromium in samples collected on the Air Center property. Arsenic and selenium were not detected in on-site samples. However due to the depth of the wells and the distance between the Silver Lake wells and the Air Center site, it is unlikely that contamination from Air Center could be affecting the Silver Lake wells.

Furthermore, the State Health Department is aware of the Silver Lake situation and monitors the distributed water on a regular basis. In addition, a human health hazard does not currently exist for the residents of Silver Lake as the well water is diluted with city water to levels that fall below the Primary Drinking Water Standards. Based on this information, FIT recommends no further Superfund action for the Silver Lake wells.

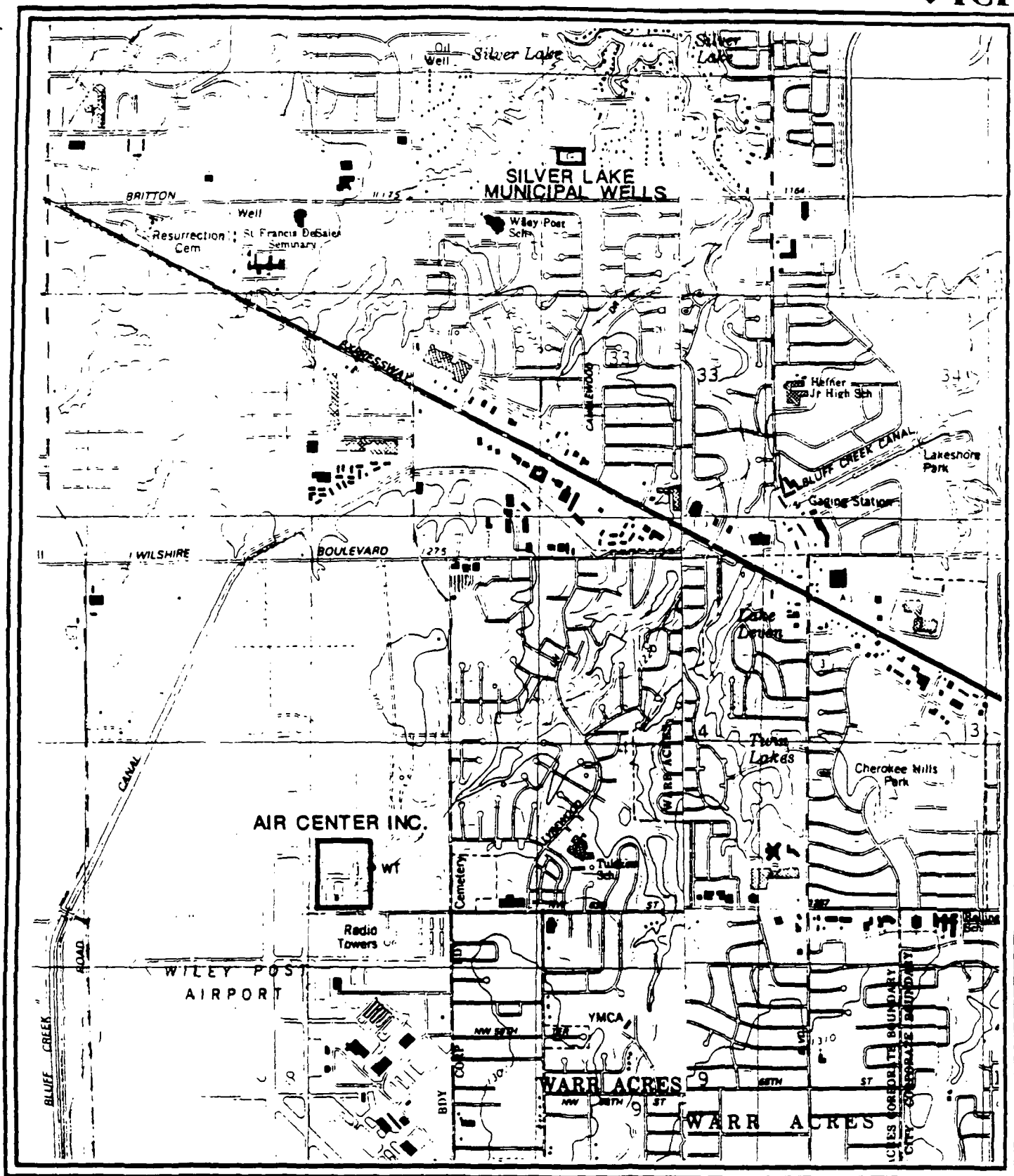
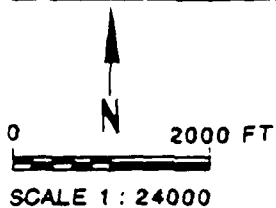


Figure 1

Site Location Map  
**AIR CENTER INCORPORATED**  
 OKLAHOMA CITY, OK  
 TDD NO. F-6-8810-10  
 CERCLIS NO. OKD980750319



OKLAHOMA  
 QUADRANGLE LOCATION  
 BETHANY, OK BRITTON, OK

# RESIDENTIAL WELL SAMPLING INFORMATION

1. Name, address and phone number of resident (include county and zip code)

North Silver Lake Community Well

Contact person: Jim Hicks-Superintendent of Property for Silver Lake, Inc

9901 Harbor Dr.: Oklahoma City, OK 73162

405-721-5036

2. Date well was dug 1940

3. Depth of well 600'

4. Depth to static water 207' when not pumping; 300' during pumping. draw  
down

5. Is the well cased? Yes XXXX No            Unknown

If so, to what depth? 600'

What type of casing is used? The casing is 5" in diameter with  
perforations from 560'-590'. The kind of casing is unknown. The operator  
thinks the casing is galvanized steel.

6. Is well screened? Yes XXXX No            Unknown

7. How much is the well pumped? (Only for residential use or for use in  
watering livestock?) The well is pumped approximately 5 hrs/day. The  
pump is automatic and runs as needed. The pump pumps 4,800 gal/hr.

8. Any other pertinent information? The north well has softer water than  
the south well. 85 families are served by the water system. The well  
water from both the north and south wells is mixed with 20% Oklahoma City  
water to dilute elevated levels of chromium and selenium that naturally  
occur in the groundwater.

RESIDENTIAL WELL SAMPLING INFORMATION

1. Name, address and phone number of resident (include county and zip code)

South Silver Lake Community Well

Contact person: Jim Hicks - Supt. of Property for Silver Lake, Inc.

9901 Harbor Dr.

Oklahoma City, Oklahoma 73162

405-721-5036

2. Date well was dug 1950

3. Depth of well 635 feet

4. Depth to static water 207 feet when not pumping; 300 feet during  
pumping, draw down

5. Is the well cased? Yes XXX No            Unknown

If so, to what depth? 635 feet

What type of casing is used? 8 5/8" of galvanized steel to 418 feet;  
7-inch cement liner with perforations from 418 feet to 635 feet.

6. Is well screened? Yes xxx No            Unknown

7. How much is the well pumped? (Only for residential use or for use in  
watering livestock?) The well is pumped approximately 5 hrs/day. The  
pump is automatic and runs as needed. The pump pumps 4,800 gal/hr.

8. Any other pertinent information? 85 families are served by the water  
system. The well water from both north and south wells is mixed with  
20% Oklahoma City water to dilute elevated levels of chromium and  
selenium that naturally occur in the groundwater.

**Attachment A**

**Past History of Silver Lake Municipal Wells**



**RECORD OF  
COMMUNICATION**

☒ XXX Phone Call ☐ Discussion ☐ Field Trip  
☐ Conference ☐ Other (Specify)

TO: Heather Schijf

ICF Technology  
FIT Biologist  
214-744-1641

FROM: Mike Harrell

Public Water Supply  
OK State Dept. of Health  
405-271-7370

DATE: 11-1-88

TIME: 3:10 pm

**SUBJECT: Past History of Silver Lake Municipal Wells**

**SUMMARY OF COMMUNICATION:**

Mr. Harrell called to inform me of the past history of the Silver Lake Municipal Wells. He said that the wells give water that contain naturally occurring arsenic, selenium, chromium, and zinc. In 1982, sampling results indicated the following: Arsenic - 58 ppb, Selenium - 86 ppb, Chromium - 43 ppb, and Zinc - 151 ppb. These samples were from well water only. In the mid-1980's the Silver Lake Water System began buying treated water from Oklahoma City, which they blend with their well water. This is blended in storage tanks. This blending is done to bring the water to levels within the drinking water standards. Mr. Harrell also said that samples are collected every three years. Since the blending of the water, the samples are collected from the distribution port after mixing. I asked Mr. Harrell if there were separate taps on each well for sampling and he said to his knowledge there were. Mr. Harrell suggested that I contact the State Environmental Laboratory for past sampling results. Contacts: Judy Duncan - Chief, or Rocky McElvaney - Assistant Chief. 405-271-5240.

**CONCLUSIONS, ACTION TAKEN OR REQUIRED:**

**INFORMATION COPIES TO:**

EPA FORM 1300-6 (7-72)

Replaces EPA HQ Form 5300-3 Which May Be Used Until Supply is Exhausted.

**RECORD OF  
COMMUNICATION**

☒ XXX

Phone Call

☐

Discussion

☐

Field  
Trip

☐

Conference

☐

Other (Specify)

TO: Heather Schiff

ICF Technology  
FIT Biologist  
214-744-1641

FROM: Mike Harrell

Public Water Supply  
OK State Dept. of Health  
405-271-7370

DATE: 11-1-88

TIME: 9:05 am

SUBJECT: Sampling of Silver Lake Municipal Wells

**SUMMARY OF COMMUNICATION:**

Mr. Harrell returned my call. I informed Mr. Harrell that we would be sampling the Silver Lake Municipal Wells on 11-7-88 and invited him to come along. He said that he was familiar with the resident who had placed the complaint. He said that the Silver Lake Wells were 600 to 700 feet deep and were draining from the Garber-Wellington Aquifer. Mr. Harrell was familiar with the Air Center Site and did not think it could be influencing the Silver Lake Wells. He said that he would contact the County Health Department to see if they would like to accompany FIT in the sampling. Mr. Harrell said that the County Health Department would call FIT if they would like to accompany FIT.

**CONCLUSIONS, ACTION TAKEN OR REQUIRED:**

**INFORMATION COPIES TO:**

EPA FORM 1300-6 (7-72)

Replaces EPA HQ Form 5300-3 Which May Be Used Until Supply is Exhausted.

**Attachment B**

**Past Analytical Results  
of samples collected from the  
Silver Lake Wells  
by the  
Oklahoma Department of Health**

ANALYST

67

# WATER ANALYSIS REPORT

LOCATION NAME- SOUTH WELL, OKLAHOMA CO  
LOCATION CODE- 001  
SAMPLE TYPE- C  
PUBLIC WATER SUPPLY SAMPLE

[illegible]

SILVERLAKE WATER ASS  
PNS RESAMPLES

CITY	REMARK	CODE	EXPLANATIONS
	* EXCEEDS	PMS	STANDARDS

## LEGAL

/ 4 / 4 / 4 SEC T R M

ANALYST

OKLAHOMA STATE DEPARTMENT OF HEALTH  
STATE WATER QUALITY LABORATORY  
WATER ANALYSIS REPORT

LOCATION NAME- NORTH WELL, OKLAHOMA CO  
LOCATION CODE- 001  
SAMPLE TYPE- C  
PUBLIC WATER SUPPLY SAMPLE

SEE REVERSE SIDE FOR WATER QUALITY REPORT SIGNIFICANCE

CITY  
REMARKS CODE EXPLANATIONS  
\* EXCEEDS PAS STANDARDS

**LEGAL**

14 14 14 SEC 1 R M

## ANALYSTS' COMMENTS

**APPLICANT COPY**

ANALYST

120753 00000

05/07/85 TIME 10:05

05/08/85

05/23/85

PMF 2005511

BES

SILVERLAKE WATER ASSCC

BILL JANACEK  
STATE ENVIRONMENTAL LAB  
FIELD SECTION/OSDM  
OKLAHOMA CITY

CK 73152

SAMPLE TYPE- D

PUBLIC WATER SUPPLY SAMPLE

IRON, CALCIUM	170.0 MG/L	CHLORIDE	13 MG/L
FLUORIDE TOTAL	0.44 MG/L	NITRITE-NITRATE AS N	< 0.5 MG/L
(LAB)	7.90 STD UNIT	SULFATE	* 260 MG/L
ALUMINUM, TOTAL DISS	* 726 MG/L	ALKALINITY, TOTAL	222 MG/L
IRON, TOTAL	279 MG/L	TURBIDITY	< 1 NTU
AMMONIUM-TOTAL	39 UG/L	BARIUM TOTAL	200 UG/L
COPPER-TOTAL	< 2 UG/L	CHROMIUM-TOTAL	40 UG/L
LEAD-TOTAL	30 UG/L	IRON-TOTAL	< 100 UG/L
MERCURY-TOTAL	< 20 UG/L	MANGANESE-TOTAL	< 20 UG/L
SILVER-TOTAL	< 0.5 UG/L	SELENIUM-TOTAL	* 36 UG/L
CADMIUM-TOTAL	3 UG/L	SODIUM-TOTAL	139 MG/L
	61 UG/L	CORROSIVITY	0.51 (CALC)

## REMARK CODE EXPLANATIONS

< LESS THAN DETECTION LIMIT  
\* EXCEEDS PWS STANDARDS

SEE REVERSE SIDE FOR WATER QUALITY REPORTS ON 10/1/85

SILVER LAKE WATER  
PWS INORGANICS ANALYSIS  
OKLAHOMA

OKLAHOMA CITY

LEGAL

SE

DEC 28

T 13N A 04W I

INITIAL VALUES WERE 58 23, THE REPORTED CR SE VALUES ARE THE MEAN OF RESAMPLES 121728 51 34, 122320 47 34, 122543/22 39.

REQUISITIONER COPY

ANALYST

122543 00000

06/27/85 TIME 11:30

06/28/85

07/17/85

PWF 2005511

WILLIAMS

SILVERLAKE WATER ASSOC

BILL JANACEK

STATE ENVIRONMENTAL LAB

FIELD SECTION/OSDH

OKLAHOMA CITY

CK 73152

LOCATION CODE- 001

SAMPLE TYPE- C

PUBLIC WATER SUPPLY SAMPLE

OMIUM-TOTAL 22 UG/L SELENIUM-TOTAL 39 UG/L

REMARK CODE EXPLANATIONS

\* EXCEEDS PWS STANDARDS

SEE REVERSE SIDE FOR WATER QUALITY REPORT SIGNIFICANCE

WELL SILVER LAKE INC

PWS RESAMPLES

OKLAHOMA

OKC

SE 28 13N 04W 1

9901 HARBOR DR., OKC OK 73132

REQUISITIONER COPY

*Cliff Letru*



122320 00000  
06/20/85 TIME 10:00 END 10:15  
06/24/85  
07/11/85  
PWF 2005511  
CW

OKLAHOMA STATE DEPARTMENT OF  
STATE WATER CONTROL  
WATER AND POLLUTION  
SILVERLAKE WATER ASSOC

BILL JANACEK  
STATE ENVIRONMENTAL LAB  
FIELD SECTION/OSDH  
OKLAHOMA CITY

OK 73152

SAMPLE TYPE- D

PUBLIC WATER SUPPLY SAMPLE

MINIUM-TOTAL 47 UG/L SELENIUM-TOTAL 3A UG/L

SEE REVERSE SIDE FOR WATER QUALITY REPORT SIGNIFICANCE

SILVER LAKE INC  
PWS RESAMPLES  
OKLAHOMA

CITY OKLAHOMA CITY

LEGAL

SE 28 13N R 04E 1'

REQUISITIONER COPY

*CLM*

121728  
06/11/85 TIME 11:15  
06/13/85  
06/21/85  
PMF 2005511  
JLV

SILVERLAKE WATER ASSCC

BILL JANACEK  
STATE ENVIRONMENTAL LAB  
FIELD SECTION/OSCH  
OKLAHOMA CITY

CK 73152

LOCATION CODE- 001  
SAMPLE TYPE- C

PUBLIC WATER SUPPLY SAMPLE

CHROMIUM-TOTAL 51 UG/L SELENIUM-TOTAL 34 UG/L

REMARK CODE EXPLANATIONS

1 EXCEEDS FWS STANDARDS

SEE REVERSE SIDE FOR WATER QUALITY ANALYSIS

SILVER LAKE INC.  
PWS RESAMPLES  
OKLAHOMA

OKLAHOMA CITY

LEGAL

SE 28 13N 64W 1

9901 PARECE DRIVE, CKC, CK 73152

REQUISITIONER COPY

*Bill Janacek*

TIME 14:20 0000C

OKLAHOMA STATE DEPARTMENT OF HEALTH  
STATE ENVIRONMENTAL LABORATORY SERVICE  
REPORT OF ANALYSIS  
**SILVERLAKE WATER ASSOC**

EILL JANCECK  
STATE ENVIRONMENTAL LAB  
OSCH/FIELD SECTION  
OKLAHOMA CITY OK 73152

OKLA. CITY/COUNTY HEALTH DEPT

SAMPLE TYPE- D  
PUBLIC WATER SUPPLY SAMPLE

CONCENTRATION IN SAMPLE

[illegible]

URGENT  
 PROGRAM  
 10-10-68  
 SILVER LAKE  
 PWS RESAPPLES  
 OKLAHOMA

CITY OKLAHOMA CITY

SE SE T 13N R 04W IM

SAMPLES	COMMENTS
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ANALYSTS  
COMMENTS

*Cliff Peterson*  
Cliff Peterson  
ENVIRONMENTAL LABORATORY SERVICE

REQUISITIONER COPY

ANALYST

OKLAHOMA STATE DEPARTMENT OF HEALTH  
STATE ENVIRONMENTAL LABORATORY SERVICE  
REPORT OF ANALYSIS  
SILVERLAKE WATER ASSOC

COPY OKLA/CITY CO HEALTH DEPT

SAMPLE TYPE- C  
PUBLIC WATER SUPPLY SAMPLE

CONCENTRATION IN SAMPLE

*Chil. L. Tr.*  
EST. 1968  
ENVIRONMENTAL LABORATORY SERVICE

149614

C0000

03/14/88

TIME 14:05 ENC 14:15

03/16/88

04/04/88

PWF 2005511

JLV

STATE DEPARTMENT OF HEALTH  
 STATE ENVIRONMENTAL LABORATORY  
 REPORT OF ANALYSIS  
 SILVERLAKE WATER ASSOC

EILL JANACEK  
 STATE ENVIRONMENTAL LAB  
 FIELD SECTION  
 OKLAHOMA CITY OK 73152

OKLA/CITY CO HEALTH DEPT

SAMPLE TYPE- C

PUBLIC WATER SUPPLY SAMPLE

ORIDE	14 MG/L	FLUORIDE TOTAL	0.65 MG/L
NITRATE-NITRATE AS N <	0.5 MG/L	SPECIFIC CONDUCTANCE	1112 UMHC/S/CM
ACIDITY	0.4 NTU	ARSENIC-TOTAL	25 UG/L
LIUM TOTAL <	200 UG/L	CADMIUM-TOTAL <	2 UG/L
OMIUM-TOTAL	51 UG/L	LEAD-TOTAL <	20 UG/L
CURY-TOTAL	0.5 UG/L	SELENIUM-TOTAL *	44 UG/L
VER-TOTAL <	3 UG/L	SODIUM-TOTAL	152 MG/L

REMARKS CODE EXPLANATIONS

< LESS THAN DETECTION LIMIT  
 \* EXCEEDS PWS STANDARDS

SILVER LAKE, INC  
 PWS INORGANICS ANALYSIS  
 OKLAHOMA

OKLAHOMA CITY

SE

LEGAL  
28

13N

04W

I.

1

ANALYST'S COMMENTS 9901 HARBOR DR. OKC. 73132

ANALYST'S  
 COMMENTS

REQUISITIONER COPY

*Theresa L. Pool*

**RECORD OF  
COMMUNICATION**

☒ XXX

Phone Call

☐

Discussion

☐

Field  
Trip

☐

Conference

☐

Other (Specify)

TO: Heather Schiif  
ICF - FIT  
214-744-1641

FROM: Scott Christianson  
Water Resources Divison  
U.S. Geological Survey  
405-231-4256

DATE:  
1-6-89

TIME: 12:30 pm

SUBJECT: Elevated levels of trace elements found in the Garber-Wellington Aquifer

**SUMMARY OF COMMUNICATION:**

Mr. Christianson returned my call. I asked Mr. Christianson about a study on the Garber-Wellington Aquifer that he was conducting for the U.S.G.S. I told him I was interested in the naturally occurring elevated levels of trace elements. Specifically, arsenic, chromium, and selenium which have been found to be above the primary drinking water standards. He said that this is a common problem in Central Oklahoma for wells drawing from the Garber-Wellington Aquifer and is not limited to the wells which serve the community of Silver Lake. He said that he thought the problem had always existed but that people have only become aware of the problem in the past 10-15 years. Furthermore, Mr. Christianson said local municipalities combat the problem by blending the well water with surface water to dilute the concentrations of the trace elements and bring the levels below the primary drinking water standards. He said that he would send water quality data for municipal wells that fell within a 5-mile radius of the Silver Lake wells.

**INFORMATION COPIES TO:**

**REFERENCE 21**

Cross -  
reference  
ret # 21 w/

---

Images  
170 CID#  
173460 -

# TARGET SHEET

**SITE NAME:** GULF STREAM AEROSPACE CORPORATION

**CERCLIS I.D.:** OKD981518327

**TITLE OF DOC.:** Reference 21 - Multi-Purpose Water Well Reports

**DATE OF DOC.:** 1-Jan-25

**NO. OF PGS. THIS TARGET SHEET REPLACES:** 23

**SDMS #:** 173460 **KEYWORD:** 95.06

**CONFIDENTIAL ?** ☒ **MISSING PAGES ?** ☐

**ALTERN. MEDIA ?** ☐ **CROSS REFERENCE ?** ☒

**LAB DOCUMENT ?** ☐ **LAB NAME:**

**ASC./BOX #:**  **RAW ANALYT. DATA ?** ☐

**CASE #:**  **SDG #:**

**COMMENTS :** Confidential sections of Reference 21 - Multi-Purpose Water Well Reports were seperated and are now located in doc ID 173460 in PC phase with keyword code of 95.06. Redacted version was included in this report (174027).



Well  
Log Data  
for 3 miles  
around Air  
Center, Inc  
1483 to 1485  
And for Bethany  
well locations

city of  
Bethany  
well  
G-1

00001

000001

city of  
Bethany  
wells

A 1

Well #	Depth of Well	Static water level	Screen interval	Use	Distance from	1-2	2-3	3-4
1	5.2	3.6	5-15	Ind./municipal		1		
2	15.2	8.7	5.5-15.5	-do-		1		
3	17.0	8.7	5-15	-do-		1		
4	17.0	9.5	5-5	-do-		1		
5	17.0	6.1	5-15	-do-		1		
6	15.0	10.2	4.5-14.5	do		1		
7	17.0	8.2	6-16	do		1		
8	40.0	20.0	20-60	Domestic	1			
9	55.0	25	45-55	-do-		1		
10	40	17	20-60	-do-		1		
11	870	373	550-757	Industrial			1	
12	75	10	20-25 45-55 75-95	Domestic			1	
13	50	20	40-50	Domestic				1
14	60	20	40-60	-do-			1	
15	827	370	538- 661-820 700-916	Municipal			1	
16	827	370	-do-	-do-			1	
17	827	-	-do-	-do-			1	
18	80	40	60-80	Domestic			1	
19	45	35	38-45	-do-			1	
20	60	20	40-60	-do-			1	
21	60	25	40-60	-do-			1	
22	100	25	25-30 45-55 75-90 95-100	do				1
23	160	-	-	-do-				1
24	120	60	60-65 65-70 70-75 75-80	-do-				1
25	140	-	-	-do-				1
26	80	28	65-75	-do-			1	
27	100	18	20-25 45-50 75-78 95-100	-do-			1	
28	78	26	65-75	-do-			1	
29	78	26	65-75	-do-			1	
30	200	-	110-130 170-200	-do-	1			
31	120	90	80-110 110-120	do			1	
32	61	-	24-40 53-59	Municipal			1	
33	69	-	54-69	-do-			1	
34	60	20	40-60	Domestic			1	
35	180	70	80-90 110-120 140-150 170-180	Domestic			1	
36	180	15	80-90 110-120 140-150 170-180	-do-			1	

Well #	Depth of Well	Static Water Level	Screen Interval	Use	0-1	1-2	2-3	3-4
37	50	65	10-12 10-13 10-14 10-15	Domestic				1
38	80	100	10-110 10-120 10-130 10-140	-do-				1
39	130	80	10-100 10-110 10-120 10-130	-do-				1
40	120	55	10-15 10-25 10-35 10-45	-do-				1
			9-10	Total	2	21	20	7
41	65	62		Municipal		1		
42	68.8	52		-do-		1		
43	68	60.3		-do-	?	?	?	?
44	65	60		-do-	?	?	?	?
45	67.4	52.5		-do-		1		
46	65	47		-do-		1		
47	62.2	58.2		-do-		1		
48	61.6	-		-do-			1	
49	63.5	46		-do-			1	
50	59.4	53.4		-do-		1		
51	61.6	-		-do-		1		
52	56.1	43		-do-			1	
53	65.9	59.5		-do-		1		
54	68.5	58		-do-	?	?	?	?
55	66.6	58.6		-do-	?	?	?	?
56	71.5	-		-do-		1		
57	77.6	65.0		-do-		1		
58	86.6	74		-do-		1		
59	70.5	58		-do-		1		
60	70.5	58		-do-		1		
61	-	24.0		-do-		1		
62	-	42.2		-do-		1		
63	-	64.2		-do-	1			
64	-	64.3		-do-	1			
65	-	19.4		-do-			1	
66	-	21.0		-do-			1	
67	-	61.0		-do-		1		
68	-	65.4		-do-		1		
69	-	26.9		-do-			1	
70	-	490.2		-do-			1	
71	-	Proposed		-do-		1		
72	-	Proposed		-do-				1
					2	27	27	1

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A 2

Well  
Log Data  
for 3 miles  
around the  
Coke Inc  
1483 to 1485  
And for Bethany  
well locations



City of  
Bethany  
well  
G-1

000001

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City of  
Bethany  
wells

A 1

Well #	Depth of Well	Static water level	Depth to water	Use	1-2	2-3	3-4
1	5.2	2.6	5-5	Test	1		
2	5.2	8.7	5-5-5	Test	1		
3	7.0	8.7	5-5	Test	1		
4	7.0	9.5	5-5	Test	1		
5	17.0	6.1	5-5	Test	1		
6	15.0	10.2	4.5-4.5	Test	1		
7	17.0	8.2	6-16	Test	1		
① 1.5	40.0	20.0	20-60	Domestic	1		
② 2.2	55.0	25	45-55	-do-	1		
10	40	17	20-60	-do-	1		
③ 1.5	870	373	550-757	Industrial		1	
④ 0.8	75	10	20-25 45-55 70-75	Domestic		1	
⑤ 1.8	50	20	40-50	Domestic		1	
⑥ 1.5	60	20	40-60	-do-		1	
15	827	370	531- 546-520 700-700 700-700	Municipal		1	
16	827	370	-do-	-do-		1	
17	827	-	-do-	-do-		1	
⑦ 1.5	80	40	60-80	Domestic		1	
⑧ 1.9	45	35	38-45	-do-		1	
⑨ 1.2	60	20	40-60	-do-		1	
⑩ 1.6	60	25	40-60	-do-		1	
⑪ 2.4	100	25	25-30 40-50 70-75 80-100	-do-		1	
⑫ 3.1	160	-	-	-do-		1	
> 4	120	60	40-45 50-70 80-90 100-120	-do-		1	
> 4	140	-	-	-do-		1	
⑬ 3.5	80	28	65-75	-do-		1	
⑭ 3.5	100	18	20-25 40-50 70-75 80-100	-do-		1	
⑮ 3.5	78	26	65-75	-do-		1	
⑯ 3.5	78	26	65-75	-do-		1	
> 4	200	-	110-130 170-200	-do-	1		
⑰ 2.8	120	90	80-90 110-120	-do-		1	
32	61	-	24-40 53-54	Municipal		1	
33	69	-	54-69	-do-		1	
⑱ 1.9	60	20	40-60	Domestic		1	
⑲ 1.9	180	70	40-45 110-120 150-160 170-180	Domestic		1	
⑳ 2.1	180	15	60-90 110-120 150-160 170-180	-do-		1	

Well #	Depth of Well	Static Water Level	Depth Interval	Use	0-1	1-2	2-3	3-4
21 2.2	50	65	10-15 15-20 20-25	Domestic				1
22 2.2	80	100	10-15 15-20 20-25	-do-				1
23 2.2	80	90	10-15 15-20 20-25	-do-				1
>4	120	55	10-15 15-20 20-25	-do-				1
				Total	2	2	20	2
41	65	62		Municipal				
42	58.8	52		-do-				
43	68	60.3		-do-	?	?	?	?
44	65	60		-do-	?	?	?	?
45	77.6	52.5		-do-		1		
46	65	67		-do-		1		
47	62.3	58.2		-do-		1		
48	61.6	-		-do-			1	
49	63.5	66		-do-			1	
50	59.6	53.6		-do-		1		
51	61.6	-		-do-		1		
52	56.1	43		-do-			1	
53	65.9	59.5		-do-		1		
54	68.5	58		-do-	?	?	?	?
55	66.6	58.6		-do-	?	?	?	?
56	71.5	-		-do-		1		
57	77.6	65.0		-do-		1		
58	86.6	74		-do-		1		
59	70.5	58		-do-		1		
60	70.5	58		-do-		1		
61	-	24.0		-do-		1		
62	-	62.2		-do-		1		
63	-	64.2		-do-	1			
64	-	64.3		-do-	1			
65	-	19.4		-do-			1	
66	-	21.0		-do-			1	
67	-	61.0		-do-		1		
68	-	65.4		-do-		1		
69	-	26.9		-do-			1	
70	-	490.2		-do-			1	
71	-	Proposed		-do-		1		
72	-	Proposed		-do-				1
				Total	2	27	27	1

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# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

1. OWNER Frontier Federal Savings & Loan ADDRESS 5757 NW Expressway  
Oklahoma City, Oklahoma 73132 PHONE 722-0959

2. LEGAL DESCRIPTION OF WELL  
NW 1 of NE 1 of NW 3 of sec. 3 TWP 12 S. RGE 4 EIM (Circle One) WIM  
ECM: COUNTY Oklahoma

3. TYPE OF WORK  
☐ New Well ☐ Plugging  
☐ Reconditioning Work  
☒ Test Monitoring

4. USE  
☐ Domestic  
☐ Stock  
☒ Test Monitoring

NON-DOMESTIC  
☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

5. DRILLING METHOD  
☐ Rotary ☐ Rev. Rotary  
☐ Cable ☒ Other Continuous  
☐ Air ☐ Flight Auger

Well B-4

## 6. LOG

Material	From	To	Notes
Fill - Clay, Red-Brown	0	2.5	
Clay - Brown to Red-Brown	2.5	10	x
Shaley Clay - Red-Brown	10	14	x
Highly Weathered Silty Shale, Red	14	17	x

## 7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

## 8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-14-85 Completed 8-14-85  
Contractor Terracon Consultants SC, Inc.  
Driller Layne D. Pech  
Diameter Hole 8 in. Total Depth 17.0 ft.

### CASING RECORD

Diameter From To  
Inside 2 in. 0 ft. 16 ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: \_\_\_\_\_ Depth of Seal: 1 ft.  
GRAVEL PACKED: Bentonite to 4 feet  
Gravel Packed From 4 ft. to 17 ft.  
Amount Used: 4.3 ft<sup>3</sup>

### PERFORATION RECORD

Type Size  
0.01 in. From 6 ft. To 16 ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

## 9. WELL TEST DATA

Static Water Level Below Land Surface 8.2 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield \_\_\_\_\_ gpm.

## 10. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

## 11. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

## 12. CERTIFICATION

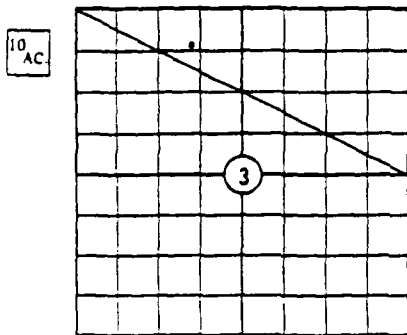
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Gerald W. Finn License # WD-342  
Address 832 NW 67th Street Phone # 848-1607  
Oklahoma City, Oklahoma 73116  
Signed \_\_\_\_\_ Date 8-26-85

RECEIVED  
AUG 29 1985

Oklahoma Water Resources Board

## 11. PLAT



NW 1 of NE 1 of NW 3 of SEC 3  
(Circle One) N  
TWP 12 S. RGE 4 EIM (Circle One) WIM ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

1. OWNER Frontier Federal Savings & Loan ADDRESS 5757 NW Expressway  
Oklahoma City, Oklahoma 73132 PHONE 722-0959

## 2. LEGAL DESCRIPTION OF WELL

NW of NE of NW of sec. 3 TWP. 12 S. RGE 4 E1M (Circle One) WIM COUNTY Oklahoma

## 3. TYPE OF WORK

☐ New Well ☐ Plugging  
☐ Reconditioning Work  
☒ Test Monitoring

## 4. USE

☐ Domestic  
☐ Stock  
☒ Test Monitoring

## NON-DOMESTIC

☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

## 5. DRILLING METHOD

☐ Rotary ☐ Rev. Rotary  
☐ Cable ☒ Other Continuous  
☐ Air Flight Auger

Well B-2

## 6. LOG

Material	From	To	Sample
Fill - Sand, Brown	0	1.5	
Fill - Clay, Red-Brown	1.5	3.5	
Clay, Dark Brown to Dark Gray	3.5	8	
Clay, Red-Brown	8	14	x
Highly-Weathered Shale Red-Brown	14	15.2	x

## 7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. \_\_\_\_\_

## 8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-14-85 Completed 8-14-85  
Contractor Terracon Consultants SC, Inc.  
Driller Layne D. Pech  
Diameter Hole 8 in. Total Depth 15.2 ft.

## CASING RECORD

Inside Diameter 4 in. From 0 ft. To 15.2 ft.  
Outside        in.        ft.        ft.  
Cement Grout Surface Seal ☒ Yes ☐ No

Type of Surface Seal:        Depth of Seal: 1 ft.  
GRAVEL PACKED: Bentonite to 3.5 feet  
Gravel Packed From 3.5 ft. to 15.2 ft.  
Amount Used: 3 ft<sup>3</sup>

## PERFORATION RECORD

Type Size 0.01 in. From 5 ft. To 15 ft.  
       From        ft. To        ft.  
       From        ft. To        ft.

## 9. WELL TEST DATA

Static Water Level Below Land Surface 9.6 ft.  
If Artesian: Flows        gpm.  
Approximate Yield        gpm.

## 10. PLUGGING DATA

Date Plugged         
Backfilled With        Material To        ft.  
Grouted or Cemented From        ft. To        ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

## 11. RECONDITIONING WORK

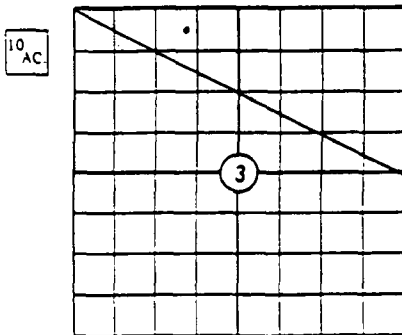
Date Completed         
☐ Replaced Casing From        ft. To        ft.  
☐ Replaced Screen From        ft. To        ft.  
Deepened Well From        ft. To        ft.  
Redeveloped Well By       

## 12. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Gerald W. Finn License # WD-342  
Address 832 NW 67th Street Phone # 848-1607  
Oklahoma City, Oklahoma 73116  
Signed        Date 8-26-85

## 11. PLAT



NW of NE of NW of SEC 3  
TWP. 12 S. RGE 4 E1M (Circle One) WIM ECM

## 12. PUMP INFORMATION

Pump Type         
Power Source         
Rated Capacity        gpm.  
Depth of Bowls or Cylinder        ft.

00003

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

1. OWNER Frontier Federal Savings & Loan ADDRESS 5757 NW Expressway  
Oklahoma City, Oklahoma 73132 PHONE 722-0959

2. LEGAL DESCRIPTION OF WELL  
NW 1 of NE 1 of NW 3 of sec. 3 TWP. 12 S. RGE. 4 EIM (Circle One) WIM  
ECM: COUNTY Oklahoma

3. TYPE OF WORK  
☐ New Well ☐ Plugging  
☐ Reconditioning Work  
☒ Test Monitoring

4. USE  
☐ Domestic  
☐ Stock  
☒ Test Monitoring

5. DRILLING METHOD  
☐ Rotary ☐ Rev. Rotary  
☐ Cable ☒ Other Continuous Flight Auger  
☐ Air  
☐ Commercial  
☐ Other

6. LOG  
Material From To  
Fill - Sand, Brown 0 1  
Fill - Clay, Red-Brown 1 3.5  
Clay - Dark Brown to Red-Brown 3.5 11 x  
Shaley Clay, Red 11 15.5 x

7. LOCATION PERMIT  
If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

8. NEW WELL CONSTRUCTION DATA  
DATES: Started 8-14-85 Completed 8-14-85  
Contractor Terracon Consultants SC, Inc.  
Driller Layne D. Pech  
Diameter Hole 8 in. Total Depth 15.2 ft.

CASING RECORD  
Diameter From To  
Inside 4 in. 0 ft. 15.5 ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: \_\_\_\_\_ Depth of Seal: 1 ft.  
GRAVEL PACKED: Bentonite to 4 feet  
Gravel Packed From 4.5 ft. to 15.5 ft.  
Amount Used: 2.8 ft<sup>3</sup>

PERFORATION RECORD  
Type-Size  
0.01 in From 5.5 ft. To 15.5 ft.  
\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

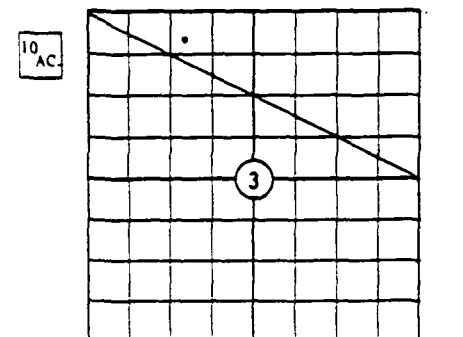
9. WELL TEST DATA  
Static Water Level Below Land Surface 8.7 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield \_\_\_\_\_ gpm.

10. PLUGGING DATA  
Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK  
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

14. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Gerald W. Finn License # WD-342  
Address 832 NW 67th Street Phone # 848-1607  
Oklahoma City, Oklahoma 73116  
Signed \_\_\_\_\_ Date 8-26-85

## 11. PLAT



NW 1 of NE 1 of NW 3 of SEC 3  
(Circle One) N  
TWP. 12 S. RGE. 4 EIM WIM ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

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# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

3

1. OWNER Frontier Federal Savings & Loan ADDRESS 5757 NW Expressway  
Oklahoma City, Oklahoma 73132 PHONE 722-0959

2. LEGAL DESCRIPTION OF WELL  
NW 1/4 of NE 1/4 of NW 1/4 of sec. 3 TWP. 12 S. RGE. 4 EIM (Circle One) WIM  
ECM: COUNTY Oklahoma

3. TYPE OF WORK  
☐ New Well ☐ Plugging  
☐ Reconditioning Work  
☒ Test Monitoring

4. USE  
☐ Domestic  
☐ Stock  
☒ Test Monitoring

NON-DOMESTIC  
☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

5. DRILLING METHOD  
☐ Rotary ☐ Rev. Rotary  
☐ Cable ☒ Other Continuous Flight Auger  
☐ Air

Well B-5

6. LOG			
Material	From	To	Remarks
Fill - Clay, Dark Red-Brown to Red-Brown	0	3	
Clay - Dark Brown to Red-Brown	3	10.5	x
Highly Weathered Silty Shale	10.5	15	x

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Oklahoma Water Resources Board

7. LOCATION PERMIT  
If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

8. NEW WELL CONSTRUCTION DATA  
DATES: Started 8-14-85 Completed 8-14-85  
Contractor Terracon Consultants SC, Inc.  
Driller Layne D. Perch  
Diameter Hole 8 in. Total Depth 17.0 ft.

## CASING RECORD

Diameter \_\_\_\_\_ From \_\_\_\_\_ To \_\_\_\_\_  
Inside 2 in. 0 ft. 15 ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: \_\_\_\_\_ Depth of Seal: 1 ft.  
GRAVEL PACKED: Bentonite to 4 feet  
Gravel Packed From 4 ft. to 15 ft.  
Amount Used: 3.6 ft<sup>3</sup>

## PERFORATION RECORD

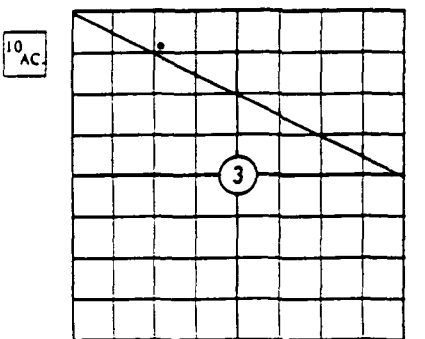
Type-Size  
0.01 in. From 5 ft. To 15 ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

9. WELL TEST DATA  
Static Water Level Below Land Surface 8.7 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield \_\_\_\_\_ gpm.

10. PLUGGING DATA  
Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK  
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

14. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Gerald W. Finn License # WD-342  
Address 832 NW 67th Street Phone # 848-1607  
Oklahoma City, Oklahoma 73116  
Signed \_\_\_\_\_ Date 8-26-85

11. PLAT  
  
NW 1/4 of NE 1/4 of NW 1/4 of SEC 3  
TWP. 12 S. RGE. 4 EIM (Circle One) WIM ECM

12. PUMP INFORMATION  
Pump \_\_\_\_\_  
Cylinder \_\_\_\_\_ gpm.  
ft.

00005



White — Water Resources Board  
Canary — Drillers Copy  
Pink — Drillers Copy

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_ (Official Use Only)

1. OWNER Frontier Federal Savings & Loan ADDRESS 5757 NW Expressway  
Oklahoma City, Oklahoma 73132 PHONE 722-0959

2. LEGAL DESCRIPTION OF WELL  
NW of NE of NW of sec. 3 TWP. 12 S. RGE. 4 EIM (Circle One) WIM  
ECM: COUNTY Oklahoma

3. TYPE OF WORK  
☐ New Well ☐ Plugging  
☐ Reconditioning Work  
☒ Test/Monitoring

4. USE  
☐ Domestic  
☐ Stock  
☒ Test/Monitoring

NON-DOMESTIC  
☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

5. DRILLING METHOD  
☐ Rotary ☐ Rev. Rotary  
☐ Cable ☒ Other Continuous  
☐ Air Flight Auger

Well B-6

6. LOG			
Material	From	To	Notes
Fill - Clay, Dark Brown to Red-Brown	0	4	
Clay, Dark Brown to Red-Brown	4	14	x
Highly Weathered Shale Red	14	15	x

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7. LOCATION PERMIT  
If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

8. NEW WELL CONSTRUCTION DATA  
DATES: Started 8-14-85 Completed 8-14-85  
Contractor Terracon Consultants SC, Inc.  
Driller Layne D. Pech  
Diameter Hole 8 in. Total Depth 17.0 ft.

CASING RECORD  
Diameter From To  
Inside 2 in. 0 ft. 15 ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: \_\_\_\_\_ Depth of Seal: 1 ft.  
GRAVEL PACKED: Bentonite to 3.5 feet  
Gravel Packed From 3.5 ft. to 15 ft.  
Amount Used: 3.7 ft<sup>3</sup>

PERFORATION RECORD  
Type Size  
0.01 in From 5 ft. To 15 ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

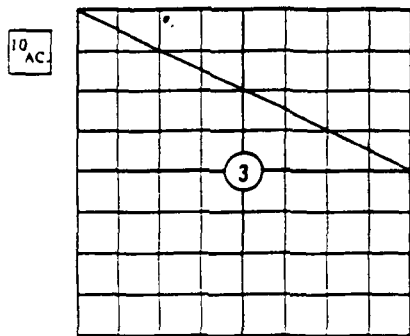
9. WELL TEST DATA  
Static Water Level Below Land Surface 9.5 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield \_\_\_\_\_ gpm.

10. PLUGGING DATA  
Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK  
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

14. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Gerald W. Finn License # WD-342  
Address 832 NW 67th Street Phone # 848-1607  
Oklahoma City, Oklahoma 73116  
Signed \_\_\_\_\_ Date 8-26-85

## 11. PLAT



NW 1/4 of NE 1/4 of NW 1/4 of SEC. 3  
TWP. 12 S. RGE. 4 EIM (Circle One) WIM

12. PUMP INFORMATION  
Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
City \_\_\_\_\_ gpm.  
Inlets or Cylinder \_\_\_\_\_ ft.

00006

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 33585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

1. OWNER Frontier Federal Savings & Loan ADDRESS 5757 NW Expressway  
Oklahoma City, Oklahoma 73132 PHONE 722-0959

2. LEGAL DESCRIPTION OF WELL  
NW 1/4 of NE 1/4 of NW 1/4 of sec. 3 TWP. 12 S. RGE. 4 EIM (Circle One) WIM  
ECM; COUNTY Oklahoma

3. TYPE OF WORK  
☐ New Well ☐ Plugging  
☐ Reconditioning Work  
☒ Test/Monitoring

4. USE  
☐ Domestic  
☐ Stock  
☒ Test/Monitoring

NON-DOMESTIC  
☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

5. DRILLING METHOD  
☐ Rotary ☐ Rev. Rotary  
☐ Cable ☒ Other Continuous  
☐ Air ☐ Flight Auger

Well B-7

6. LOG	Material	From	To	Notes
	Fill - Clay, Red-Brown	0	4	
	Clay - Brown to Red-Brown	4	11	
	Highly-Weathered Shale Red	11	15	

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Oklahoma Water Resources Board

7. LOCATION PERMIT  
If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

8. NEW WELL CONSTRUCTION DATA  
DATES: Started 8-14-85 Completed 8-14-85  
Contractor Terracon Consultants SC, Inc.  
Driller Layne D. Pech  
Diameter Hole 8 in. Total Depth 17.0 ft.

## CASING RECORD

Diameter 2 in. From 0 ft. To 15 ft.  
Inside 2 in. Outside 2 in.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: \_\_\_\_\_ Depth of Seal: 1 ft.  
GRAVEL PACKED: Bentonite to 3.5 feet  
Gravel Packed From 3.5 ft. to 15 ft.  
Amount Used: 3.7 ft<sup>3</sup>

## PERFORATION RECORD

Type Size  
0.01 in. From 5 ft. To 15 ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

9. WELL TEST DATA  
Static Water Level Below Land Surface 6.1 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield \_\_\_\_\_ gpm.

10. PLUGGING DATA  
Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK  
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

14. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Gerald W. Finn License # WD-342  
Address 832 NW 67th Street Phone # 848-1607  
Oklahoma City, Oklahoma 73116  
Signed \_\_\_\_\_ Date 8-26-85

NW 1/4 of NE 1/4 of NW 1/4 of SEC 3  
TWP. 12 S. RGE. 4 EIM (Circle One) WIM ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Bowls or Cylinder \_\_\_\_\_ ft.

00007

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

1. OWNER Frontier Federal Savings & Loan ADDRESS 5757 NW Expressway  
Oklahoma City, Oklahoma 73132 PHONE 722-0959

2. LEGAL DESCRIPTION OF WELL  
NW    of NE    of NW    of sec.   3   TWP   12   S. RGE   4   E1M (Circle One) WIM  
ECM: COUNTY Oklahoma

3. TYPE OF WORK  
☐ New Well ☐ Plugging  
☐ Reconditioning Work  
☒ Test/Monitoring

4. USE  
☐ Domestic  
☐ Stock  
☒ Test/Monitoring

NON-DOMESTIC  
☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

5. DRILLING METHOD  
☐ Rotary ☐ Rev. Rotary  
☐ Cable ☒ Other Continuous  
☐ Air Flight Auger

6. LOG  
Material From To  
Well 8-1

7. LOCATION PERMIT  
If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

Material	From	To	Notes
Fill - Silty Sand Brown to Tan	0	1	
Fill - Sandy Clay Red-Brown	1	4.5	
Clay, Dark Brown to Red-Brown	4.5	12.5	x
Shaley Clay Red-Brown	12.5	15	x

## 8. NEW WELL CONSTRUCTION DATA

DATES: Started 8-14-85 Completed 8-14-85  
Contractor Terracon Consultants SC, Inc.  
Driller Layne D. Pech  
Diameter Hole 8 in. Total Depth 15 ft.

## CASING RECORD

Diameter	From	To
Inside <u>4</u> in.	<u>0</u> ft.	<u>14.5</u> ft.
Outside _____ in.	_____ ft.	_____ ft.

Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: \_\_\_\_\_ Depth of Seal: 1 ft.  
GRAVEL PACKED: Bentonite to 3.5 feet  
Gravel Packed From 3.5 ft. to \_\_\_\_\_ ft.  
Amount Used: 2.9 ft<sup>3</sup>

## PERFORATION RECORD

Type/Size	From	To
<u>0.01 in.</u>	<u>4.5</u> ft.	<u>14.5</u> ft.
_____	_____ ft.	_____ ft.
_____	_____ ft.	_____ ft.

## 9. WELL TEST DATA

Static Water Level Below Land Surface 10.2 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield \_\_\_\_\_ gpm.

## 10. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

## 11. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

## 12. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Gerald W. Finn License # WD-342  
Address 832 NW 67th Street Phone # 848-1607  
Oklahoma City, Oklahoma 73116  
Signed \_\_\_\_\_ Date 8-26-85

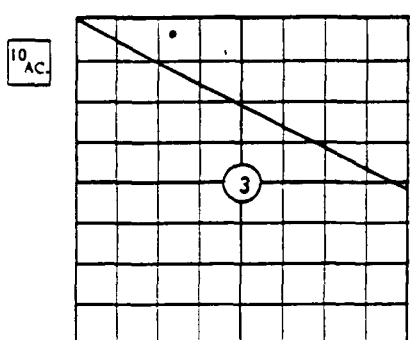
## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

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Oklahoma Water Resources Board

## 11. PLAT



NW    of NE    of NW    of SEC   3    
TWP   12   S. RGE   4   E1M (Circle One) WIM ECM

00008

MULTI PURPOSE WATER WELL REPORT

OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL

(b) (9)

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other

6. LOG

Material	From	To	Notes
Gravel & gravel	0	31	
Red rock	31	40	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 26 Jan 84 Completed Jan 84  
Contractor Winder Supply Drilling Co.  
Driller DAVID  
Diameter Hole 12 in. Total Depth 40 ft.

CASING RECORD

Diameter 4 1/2 in. From 0 ft. To 40 ft.  
Surface Seal: ☒ Yes ☐ No Type: Steel Cement  
Depth of Seal: 10 ft.  
Gravel Packed:  
Gravel Packed From 10 ft. to 40 ft.  
Amount Used: 41-6

PERFORATION RECORD

Type Slot From 20 ft. To 40 ft.  
Size 47 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
" \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 26 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown 20 ft. After Pumping \_\_\_\_\_ hrs. At 10 gpm.  
Size of Bailer: \_\_\_\_\_ gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

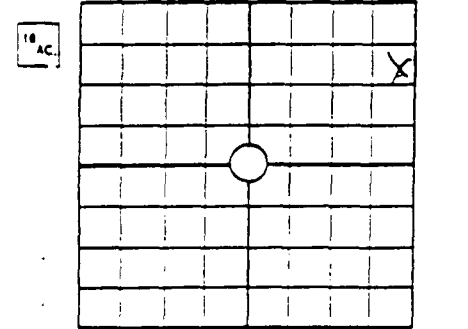
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Winder Supply Drilling License # 410-33  
Address 410 N. 10th Ave. OKC 73107 Phone # 943-3804  
Signed David C. Winder Date 26 Jan 84

11. PLAT



SE 1/4 of 10E 1/4 of 22N 1/4 of SEC 5

TWP 12 S. RGE 4 EIM. WIMECM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bore or Cylinder \_\_\_\_\_ ft.

MULTI-PURPOSE WATER WELL REPORT

GR  
na

OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_

(b) (9)

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☒ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

6. LOG

Material	From	To	Remarks
0-15 clay	0	15	
Sand	15	50	
Red bed	50	55	

7. NEW WELL CONSTRUCTION DATA

Dates: Started \_\_\_\_\_ Completed \_\_\_\_\_  
Contractor Boindexter Supply  
Driller DAVID  
Diameter Hole \_\_\_\_\_ in. Total Depth \_\_\_\_\_ ft.

CASING RECORD

Diameter \_\_\_\_\_ From \_\_\_\_\_ To \_\_\_\_\_  
\_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Surface Seal: ☒ Yes ☐ No Type: RED CEMENT  
Depth of Seal: 10' ft.  
Gravel Packed:  
Gravel Packed From 10 ft. to 55 ft.  
Amount Used: ALL

PERFORATION RECORD

Type Slot From 45 ft. To 55 ft.  
Size 4 1/2 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
" \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 25 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/f Quality \_\_\_\_\_

BAILER TEST

Drawdown 3 1/2 ft. After Pumping \_\_\_\_\_ hrs. At 15 gpm.  
Size of Bailer: 7 gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

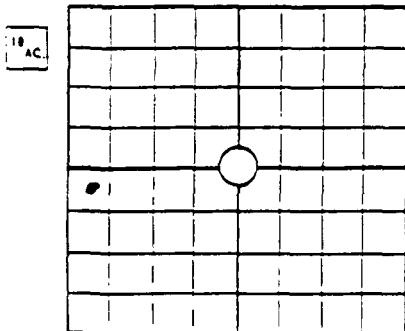
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Boindexter Supply Co. License # WD-33  
Address 1000 N E 10th St. P O Box 53585 Phone # 943-3864  
Signed David C. Boindexter Date 5 July 83

11. PLAT



1/4 of 1/4 of SEC 6

TWP 12 S: RGE 4 EIM: WMECM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bows or Cylinder \_\_\_\_\_ ft.

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

OWNER Riverside Salvage ADDRESS 6800 SW 15th  
OK PHONE 789-7177

LEGAL DESCRIPTION OF WELL  
SE 1/4 of 1/4 of Sec 9 of sec. 9 TWP. 12 S. RGE 4 EIM (Circle One) WIM COUNTY Oklahoma

TYPE OF WORK  
☒ New Well ☐ Plugging  
☐ Reconditioning Work  
☐ Test/Monitoring

4. USE  
☒ Domestic  
☐ Stock  
☐ Test/Monitoring

NON-DOMESTIC  
☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

5. DRILLING METHOD  
☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other  
☒ Air

Material	From	To	Salu- rated
Sand Good Gravel	0	31	
ed Bed	31	40	

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7. LOCATION PERMIT  
If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

8. NEW WELL CONSTRUCTION DATA  
DATES: Started 4 October Completed 4th Oct 85  
Contractor Pindexter Drilling  
Driller David Pindexter  
Diameter Hole 4 1/2 in. Total Depth 40 ft.

CASING RECORD  
Diameter 4 1/2 in. From 10 ft. To 40 ft.  
Inside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: Steel + Cement Depth of Seal: 10 ft.  
GRAVEL PACKED:  
Gravel Packed From 0 ft. to 40 ft.  
Amount Used: all

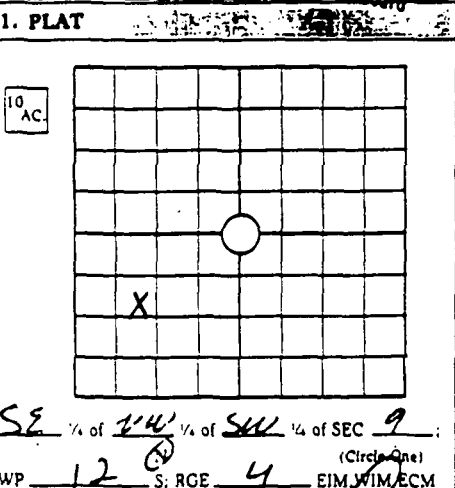
PERFORATION RECORD  
Type/Size 4 1/2 From 20 ft. To 40 ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

9. WELL TEST DATA  
Static Water Level Below Land Surface 17 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield 15 gpm.

10. PLUGGING DATA  
Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK  
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

14. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Pindexter Drilling License # WD-33  
Address 4800 SW 10th Ave Phone # 943-3804  
Signed David C. Pindexter Date 5/8/85



12. PUMP INFORMATION  
Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

00012

OWNER ESDAV SE COMPANY ADDRESS 304 N. JACKSON  
Wart Acres, Oklahoma 73122 PHONE 787-9545

LOCAL DESCRIPTION OF WELL  
E SE SE SE  
1/4 of SE 1/4 of SE 1/4 of sec. 16 TWP. 12 S. Rge. 4W  
EIM WIM ECM: COUNTY Oklahoma

TYPE OF WORK  
☒ Drilling ☐ Flapping ☐ Domestic ☐ Irrigation ☐ Stock ☐ Rotary ☐ Rev. Rotary  
☐ Municipal ☐ Industrial ☐ Test ☐ Cable ☐ Other

Material	From	To	Notes
Sand & gravel	0	45	
sand & shale	45	502	
water	502	508	
shale	508	521	
water	521	530	
shale	530	544	
water	544	550	
shale	550	560	
water	560	576	
shale	576	586	
water	586	622	
shale	622	634	
water	634	641	
shale	641	660	
water	660	694	
shale	694	700	
water	700	709	
shale	709	714	
water	714	722	
shale	722	728	
water	728	745	
shale	745	754	
water	754	768	
shale	768	870	

Lost some hole & plugged, set bridge plug at 752 to hold plug down.

Dates: Started December 30, 1980 Completed January 12, 1982  
Contractor Poinexter Thomas Exploration  
Driller Larry Brown  
Diameter Hole 11 1/4 in. Total Depth 870 ft.

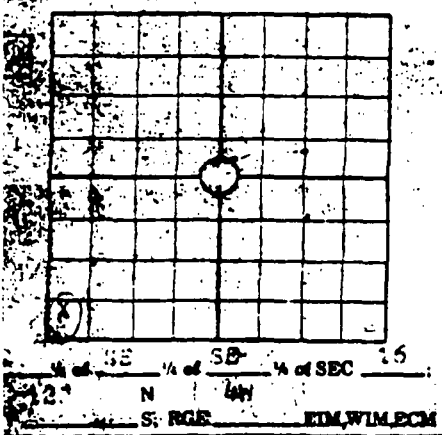
CASING RECORD  
16" Diameter From 0 To 57 ft.  
8 5/8" Diameter From 0 To 505 ft.  
Surface Seal: ☐ Yes ☐ No Type: cemented from top to bottom  
Depth of Seal: 0 ft.  
Gravel Packed: 0 ft. to 0 ft.  
Gravel Packed From 0 ft. to 0 ft.  
Amount Used: 0 ft.

PERFORATION RECORD  
4 shot to the foot  
Type 401 shots From 550 ft. To 757 ft.  
Size 0 From 0 ft. To 0 ft.  
" 0 From 0 ft. To 0 ft.

Static Water Level Below Land Surface 373 ft.  
If Artesian: Flows 0 gpm.  
Water Temp. 62 °C/F Quality 5.5 grains hard

BAILER TEST  
Drawdown none ft. After Pumping 16 hrs. At 0 gal.  
Size of Bailer: 0 gal. ran bailer for 1 1/2 min. off top

PUMPING TEST  
Drawdown 15 ft. After Pumping 0 hrs. At 50 gal.



Date Plugged 0  
Backfilled With 0 Material To 0 ft.  
Grouted or Cemented From 0 ft. To 0 ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

Date Completed 0  
☐ Replaced Casing From 0 ft. To 0 ft.  
☐ Replaced Screen From 0 ft. To 0 ft.  
Deepened Well From 0 ft. To 0 ft.  
Redeveloped Well By 0

submersible  
Type 0 100 ft. 3 phase  
Type 0 30  
Type 0 30  
Type 0 30

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name David Poinexter License # 40 33  
Address 4610 N. 10th Phone # 943-3804  
Signed David Poinexter Date 1/12/82

USE ADDITIONAL SHEETS IF NECESSARY

MULTI-PURPOSE WATER WELL REPORT

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_  
EIM \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL

(b) (9)

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☒ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☐ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

6. LOG

Material	From	To	Notes
top soil	0	4	
sand	4	4.5	
red shale	4.5	7.5	

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OCT 4 1984

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7. NEW WELL CONSTRUCTION DATA

Dates: Started 2-22-84 Completed 2-22-84  
Contractor Wagoner Water Well Drilling  
Driller Wagoner  
Diameter Hole 2 1/2 in. Total Depth 7.5 ft.

CASING RECORD

Diameter 1 1/2 in. From 0 ft. To 7.5 ft.  
" 1 1/2 in. " 0 ft. " 7.5 ft.

Surface Seal: ☒ Yes ☐ No Type: cement  
Depth of Seal: 10 ft.  
Gravel Packed: yes  
Gravel Packed From 0 ft. to 7.5 ft.  
Amount Used: 200 lbs.

PERFORATION RECORD

Type: none From 0 ft. To 7.5 ft.  
Size 0.30 in. From 0 ft. To 7.5 ft.  
" 0.30 in. From 0 ft. To 7.5 ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 10 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. 60 °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.  
Size of Bailer: 1 1/2 gal.

PUMPING TEST

Drawdown 10 ft. After Pumping \_\_\_\_\_ hrs. At 10 gpm.

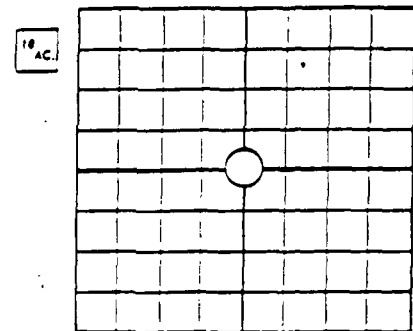
9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. PLAT



10 AC.  
TWP 7 N S. RGE 4 W EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bows or Cylinder \_\_\_\_\_ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name George T. Fowler License # 22-100  
Address 2000 N. Wagoner St. OKC Phone # 222-1000  
Signed George T. Fowler Date 2-1-84



MULTI-PURPOSE WATER WELL REPORT

OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_  
PHONE \_\_\_\_\_

(b) (9)

TYPE OF WORK		4. PROPOSED / PAST USE		5. DRILLING METHOD	
<input checked="" type="checkbox"/> New Well	<input type="checkbox"/> Plugging	<input type="checkbox"/> Domestic	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Stock	<input type="checkbox"/> Rotary
<input type="checkbox"/> Reconditioning Work	<input type="checkbox"/> Test	<input type="checkbox"/> Municipal	<input type="checkbox"/> Industrial	<input type="checkbox"/> Test	<input type="checkbox"/> Rev. Rotary
					<input type="checkbox"/> Cable
					<input type="checkbox"/> Other _____

6. LOG			
Material	From	To	Notes
Clay & Sand	0	20	
Sand	20	40	
Red Bed	40	50	

7. NEW WELL CONSTRUCTION DATA	
Dates: Started <u>11 May</u>	Completed <u>Same</u>
Contractor <u>David L. Smith</u>	
Driller <u>David</u>	
Diameter Hole <u>3</u> in.	Total Depth <u>50</u> ft.

CASING RECORD	
Diameter <u>4 1/2</u> in.	From <u>0</u> ft. To <u>50</u> ft.
Surface Seal: <input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Depth of Seal: <u>10</u> ft.	Type: _____
Gravel Packed:	
Gravel Packed From <u>10</u> ft.	to <u>50</u> ft.
Amount Used: <u>all</u>	

PERFORATION RECORD	
Type <u>Slot</u>	From <u>40</u> ft. To <u>50</u> ft.
Size <u>1/2</u>	From _____ ft. To _____ ft.
"	From _____ ft. To _____ ft.

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Oklahoma Water Resources Board

11. PLAT	
10 AC.	

N 1/2 of SW 1/4 of SE 1/4 of SEC 17  
TWP 12 N S. RGE 4 E EIM, WIMECM

12. PUMP INFORMATION	
Pump Type _____	
Power Source _____	
Rated Capacity _____ gpm.	
Depth of Bowls or Cylinder _____ ft.	

8. WELL TEST DATA	
Static Water Level Below Land Surface <u>20'</u> ft.	
If Artesian: Flows _____ gpm.	
Water Temp. _____ °C/F	Quality _____

BAILER TEST	
Drawdown <u>all the way</u>	After Pumping _____ hrs. At <u>4</u> gpm.
Size of Bailer: <u>7</u> gal.	

PUMPING TEST	
Drawdown _____ ft.	After Pumping _____ hrs. At _____ gpm.

9. PLUGGING DATA	
Date Plugged _____	
Backfilled With _____	Material To _____ ft.
Grouted or Cemented From _____ ft.	To _____ ft.
Plot Location in Item 11. Show Distances From 2 Section Lines.	

10. RECONDITIONING WORK	
Date Completed _____	
<input type="checkbox"/> Replaced Casing From _____ ft.	To _____ ft.
<input type="checkbox"/> Replaced Screen From _____ ft.	To _____ ft.
Deepened Well From _____ ft.	To _____ ft.
Redeveloped Well By _____	

13. CERTIFICATION	
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.	
Name <u>David L. Smith</u>	License # <u>40737</u>
Address <u>4010 N. 10th</u>	Phone # <u>918-712-7122</u>
Signed <u>David L. Smith</u>	Date <u>15 May 84</u>

White — Water Resources Board  
Canary — Drillers Copy  
Pink — Drillers Copy

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_

(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

QR  
NA

1. OWNER \_\_\_\_\_

ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_

FAX \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL \_\_\_\_\_

(b) (9)

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other

6. LOG

Material	From	To	Set Pipes
Sand	0	55	
Red Mud	55	60	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 18 Aug 83 Completed Same  
Contractor WINDYBEE  
Driller DAVID  
Diameter Hole 4 1/2 in. Total Depth 60 ft.

CASING RECORD

Diameter 4 1/2 in. From 0 ft. To 60 ft.  
Surface Seal: ☒ Yes ☐ No Type: Steel & Cement  
Depth of Seal: 10 ft.  
Gravel Packed:  
Gravel Packed From 10 ft. to 60 ft.  
Amount Used: all

PERFORATION RECORD

Type Slot From 40 ft. To 60 ft.  
Size 4 1/2 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
" From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

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8. WELL TEST DATA

Static Water Level Below Land Surface 20 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown 20 ft. After Pumping \_\_\_\_\_ hrs. At 20-5 gpm.  
Size of Bailer: 7 gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Burley & Sons Drilling License # WD-33  
Address 1000 W. 10th St. OKC 73127 Phone # 943-3804  
Signed David R. Burley Date August 18, 1983

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinders \_\_\_\_\_ ft.

00016

White - Water Resources Board  
Canary - Drillers Copy  
Pink - Drillers Copy  
JUL 13 1981

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10TH STREET, P.O. BOX 53585  
OKLAHOMA CITY, OKLAHOMA 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_

(Official Use Only)

OKLA. WATER RESOURCES BOARD

MULTI-PURPOSE WATER WELL REPORT

PAGE 1

1. OWNER Bethany, City of ADDRESS 6700 N.W. 36th Street  
Bethany, Oklahoma 73008 PHONE \_\_\_\_\_  
2. LEGAL DESCRIPTION OF WELL Well No. G1  
NW 1/4 of SW 1/4 of NE 1/4 of sec. 21 TWP. 12 N Rge. 4 WIM \_\_\_\_\_  
COUNTY Oklahoma

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☒ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☐ Rotary ☒ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

Material	From	To	Notes
Clay, sandy	8	18	
Sand, fine grained	18	48	
Clay, very sandy	48	54	
Sand	54	98	
Sandstone w/shale lense	98	125.1	
Shale, sandy, red, dry	125.1	350	
Shale, sandy, red, dry			
w/sandstone lenses	350	400	
Sandstone w/shale lense	400	420	
dry			
Shale, sandy, red, dry w/	420	467	
sandstone lenses	467	560	X
Sandstone, red, water			
Sandstone, red w/shale	560	580	
seams			
Shale, sandy, red w/	580	610	X
sandstone lenses			
Sandstone, red w/red	610	635	X
shale lenses	635	650	X
Sandstone, red			
Sandstone, red w/red	650	680	X
shale lenses			
Shale, red w/sandstone	680	700	
lenses	700	710	X
Sandstone, tan			
Sandstone, red w/red	710	730	X
shale lenses	730	760	
Sandstone, red-tan			

Dates: Started 3-30-81 Completed 4-7-81  
Contractor Hemphill Corporation  
Driller Henkle  
Diameter Hole 15 5/8 in. Total Depth 827 ft.

CASING RECORD

Diameter From To  
8 in. 0 ft. 827 ft.  
Surface Seal: ☒ Yes ☐ No Type: Cement grout  
Depth of Seal: 470 ft.  
Gravel Packed:  
Gravel Packed From 470 ft. to 827 ft.  
Amount Used: 1060 cu. ft.

PERFORATION RECORD

Type Stainless From 538 ft. To 556 ft.  
Size Steel Well From 594 ft. To 602 ft.  
" Screen - .020 From 626 ft. To 650 ft.  
666 to 680; 700 to 714; 728 to 738; 786 to 819.

Static Water Level Below Land Surface 370 ft.  
If Artesian: Flows n/a gpm.  
Water Temp. 17 °C/° Quality Good

BAILER TEST

Drawdown n/a ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.  
Size of Bailer: \_\_\_\_\_ gal.

PUMPING TEST

Drawdown 500 ft. After Pumping 6 hrs. At 600 gpm.

Date Plugged n/a  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

Date Completed n/a  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Elmer I. Hemphill License # WD-133  
Address 4834 S. 83 E. Ave., Tulsa, OK Phone # 918-622-5133  
Signed \_\_\_\_\_ Date 7-8-81

Site - Water Resources Board  
inary - Driller's  
nk - Driller's Copy

RECEIVED

JUL 13 1981

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10TH STREET, P.O. BOX 53585  
OKLAHOMA CITY, OKLAHOMA 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

MULTI PURPOSE WATER WELL REPORT

PAGE 2

OKLA, WATER RESOURCES BOARD

OWNER Bethany, City of ADDRESS 6700 N.W. 36th Street

Bethany, Oklahoma 73008

PHONE \_\_\_\_\_

LEGAL DESCRIPTION OF WELL Well No. G1

NW 1/4 of SW 1/4 of NE 1/4 of sec. 21 TWP. 12 N Rge. 4 WIM \_\_\_\_\_ COUNTY Oklahoma

TYPE OF WORK

New Well ☐ Plugging  
Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☒ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD(S)

☐ Rotary ☒ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

LOG

Material	From	To	Notes
Shale, red w/sandstone lenses	760	800	X
Sandstone, red w/red shale lenses	800	827	X

7. NEW WELL CONSTRUCTION DATA

Date: Started 3-30-81 Completed 4-7-81  
Contractor Hemphill Corporation  
Driller Henkle  
Diameter Hole 15 5/8 in. Total Depth 827 ft.

CASING RECORD

Diameter 8 in. From 0 ft. To 822 ft.  
Surface Seal: ☒ Yes ☐ No Type: Cement grout  
Depth of Seal: 470 ft.  
Gravel Packed:  
Gravel Packed From 470 ft. to 827 ft.  
Amount Used: 1060 cu. ft.

PERFORATION RECORD

Type Stainless From 538 ft. To 556 ft.  
Size Steel Well From 594 ft. To 602 ft.  
" Screen .020 From 626 ft. To 650 ft.  
666 to 680; 700 to 714; 728 to 738; 786 to 818.

8. WELL TEST DATA

Static Water Level Below Land Surface 370 ft.  
If Artesian: Flows n/a gpm.  
Water Temp. 17 °C Quality Good

BAILER TEST

Drawdown n/a ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.  
Size of Bailer: \_\_\_\_\_ gal.

PUMPING TEST

Drawdown 500 ft. After Pumping 6 hrs. At 600 gpm.

9. PLUGGING DATA

Date Plugged n/a  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed n/a  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

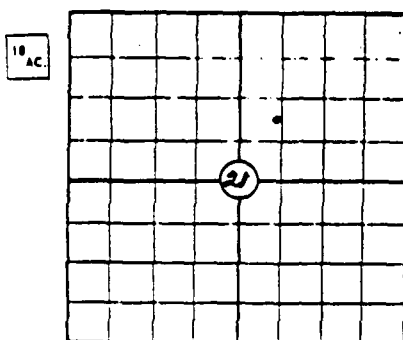
11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Elmer L. Hemphill License # WD-133  
Address 4834 S. 83 E. Ave., Tulsa, OK. Phone # 918-622-5133

Signature \_\_\_\_\_ Date 7-8-81

11. PLAT



NW 1/4 of SW 1/4 of NE 1/4 of SEC 21  
TWP. 12 N RGE. 4 WIM \_\_\_\_\_

12. PUMP INFORMATION

Pump Type Submersible  
Power Source 460 V - 3 phase  
Rated Capacity 350 gpm.  
Depth of Bowls or Cylinder 720 ft.

00018

White - Water Resources Board  
Canary - Drillers Copy  
Pink - Drillers Copy

JUL 13 1981

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10TH STREET, P.O. BOX 53585  
OKLAHOMA CITY, OKLAHOMA 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_

(Official Use Only)

OKLA. WATER RESOURCES BOARD

MULTI-PURPOSE WATER WELL REPORT

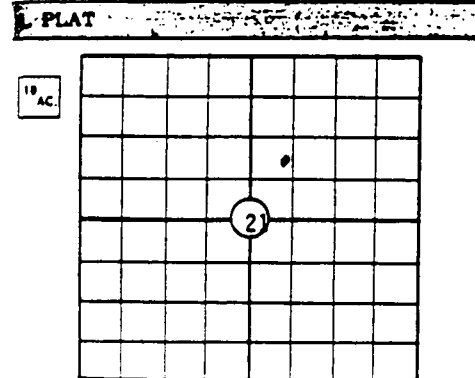
PAGE 1

1. OWNER Bethany, City of ADDRESS 6700 N.W. 36th Street  
Bethany, Oklahoma 73008 PHONE \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL Well No. G1  
NW 1/4 of SW 1/4 of NE 1/4 of sec. 21 TWP. 12 N Rge. 4 WIM  
COUNTY Oklahoma

3. TYPE OF WORK  
☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test  
4. PROPOSED / PAST USE  
☐ Domestic ☐ Irrigation ☐ Stock  
☒ Municipal ☐ Industrial ☐ Test  
5. DRILLING METHOD  
☐ Rotary ☒ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

LOG			
Material	From	To	Satu- rated
Clay, sandy	8	18	
Sand, fine grained	18	48	
Clay, very sandy	48	54	
Sand	54	98	
Sandstone w/shale lense	98	125.1	
Shale, sandy, red, dry	125.1	350	
Shale, sandy, red, dry			
w/sandstone lenses	350	400	
Sandstone w/shale lense	400	420	
dry			
Shale, sandy, red, dry w/	420	467	
sandstone lenses	467	560	X
Sandstone, red, water			
sandstone, red w/shale	560	580	
seams			
Shale, sandy, red w/	580	610	X
sandstone lenses			
Sandstone, red w/red	610	635	X
shale lenses	635	650	X
Sandstone, red			
Sandstone, red w/red	650	680	X
shale lenses			
Shale, red w/sandstone	680	700	
lenses	700	710	X
Sandstone, tan			
Sandstone, red w/red	710	730	X
shale lenses	730	760	
Sandstone, red-tan			



NW 1/4 of SW 1/4 of NE 1/4 of SEC 21  
TWP. 12 N RGE. 4 WIM

2. PUMP INFORMATION  
Pump Type Submersible  
Power Source 460 V - 3 phase  
Rated Capacity 350 gpm.  
Depth of Bowls or Cylinder 720 ft.

7. NEW WELL CONSTRUCTION DATA  
Dates: Started 3-30-81 Completed 4-7-81  
Contractor Hemphill Corporation  
Driller Henkle  
Diameter Hole 15 5/8 in. Total Depth 827 ft.

CASING RECORD  
Diameter 8 in. From 0 ft. To 822 ft.  
Surface Seal: ☒ Yes ☐ No Type: Cement grout  
Depth of Seal: 470 ft.  
Gravel Packed:  
Gravel Packed From 470 ft. to 827 ft.  
Amount Used: 1060 cu. ft.

PERFORATION RECORD  
Type Stainless From 538 ft. To 556 ft.  
Size Steel Well From 594 ft. To 602 ft.  
" Screen - 020 From 626 ft. To 650 ft.  
666 to 680; 700 to 714; 728 to 738; 786 to 819.

8. WELL TEST DATA  
Static Water Level Below Land Surface 370 ft.  
If Artesian: Flows n/a gpm.  
Water Temp. 17 °C Quality Good

BAILER TEST  
Drawdown n/a ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.  
Size of Bailer: \_\_\_\_\_ gal.

PUMPING TEST  
Drawdown 500 ft. After Pumping 6 hrs. At 600 gpm.

9. PLUGGING DATA  
Date Plugged n/a  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK  
Date Completed n/a  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Elmer I. Hemphill License # WD-133  
Address 4834 S. 83 E. Ave., Tulsa, OK Phone # 918-622-5133  
Signed \_\_\_\_\_ Date 7-8-81

JUL 13 1981

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10TH STREET, P.O. BOX 53585  
OKLAHOMA CITY, OKLAHOMA 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_

(Official Use Only)

PAGE 2

NA

MULTI-PURPOSE WATER WELL REPORT

OKLA. WATER RESOURCES BOARD

OWNER Bethany, City of ADDRESS 6700 N.W. 36th Street

Bethany, Oklahoma 73008

PHONE \_\_\_\_\_

LEGAL DESCRIPTION OF WELL Well No. G1

NW 1/4 of SW 1/4 of NE 1/4 of sec. 21 TWP. 12 N Rge. 4 COUNTY Oklahoma

TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☒ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☐ Rotary ☒ Rev. Rotary  
☐ Cable ☐ Other

Material	From	To	Notes
HALE, red w/sandstone lenses	760	800	X
sandstone, red w/red shale lenses	800	827	X

NEW WELL CONSTRUCTION DATA

Dates: Started 3-30-81 Completed 4-7-81  
Contractor Hemphill Corporation  
Driller Henkle  
Diameter Hole 15 5/8 in. Total Depth 827 ft.

CASING RECORD

Diameter 8 in. From 0 ft. To 822 ft.  
Surface Seal: ☒ Yes ☐ No Type: Cement grout  
Depth of Seal: 470 ft.  
Gravel Packed:  
Gravel Packed From 470 ft. to 827 ft.  
Amount Used: 1060 cu. ft.

PERFORATION RECORD

Type Stainless From 538 ft. To 556 ft.  
Size Steel Well From 594 ft. To 602 ft.  
" Screen-.020 From 626 ft. To 650 ft.  
666 to 680; 700 to 714; 728 to 738; 786 to 818.

WELL TEST DATA

Static Water Level Below Land Surface 370 ft.  
If Artesian: Flows n/a gpm.  
Water Temp. 17 °C Quality Good

BAILER TEST

Drawdown n/a ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.  
Size of Bailer: \_\_\_\_\_ gal.

PUMPING TEST

Drawdown 500 ft. After Pumping 6 hrs. At 600 gpm.

PLUGGING DATA

Date Plugged n/a  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

RECONDITIONING WORK

Date Completed n/a  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

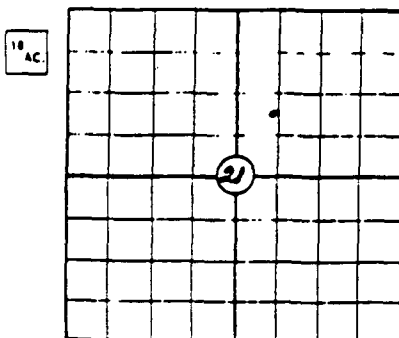
CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Elmer L. Hemphill License # WD-133  
Address 4834 S. 83 E. Ave., Tulsa, OK. Phone # 918-622-5133

Signed \_\_\_\_\_ Date 7-8-81

PLAT



NW 1/4 of SW 1/4 of NE 1/4 of SEC 21

TWP. 12 N RGE. 4 WIM. \_\_\_\_\_

PUMP INFORMATION

Pump Type Submersible  
Power Source 460 V - 3 phase  
Rated Capacity 350 gpm.  
Depth of Bowls or Cylinder 720 ft.

00019

White — Water Resources Board  
Canary — Drillers Copy  
Pink — Drillers Copy

OKLAHOMA WATER RESOURCES BOARD  
1100 N. and Stonewall 12th Floor  
Oklahoma City, Oklahoma 73105

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
5th Floor Jim Thorpe Building  
Oklahoma City, Oklahoma 73105

Application No. 17  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_

(Official Use Only)

NA

MULTI-PURPOSE WATER WELL REPORT

1. OWNER City of Bethany ADDRESS Bethany, Oklahoma  
The Water Storage Tank at Peniel Ave. & NW 31st. Terrace PHONE \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL  
NW 1/4 of SW 1/4 of NE 1/4 of sec. 21 TWP. 12 S. Rge. 4 EIM WIM ECM: COUNTY Oklahoma

3. TYPE OF WORK  
☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE  
☐ Domestic ☐ Irrigation ☐ Stock  
☒ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD  
☐ Rotary ☒ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

LOG			
Material	From	To	Natu rated
SEE ATTACHED LOG			

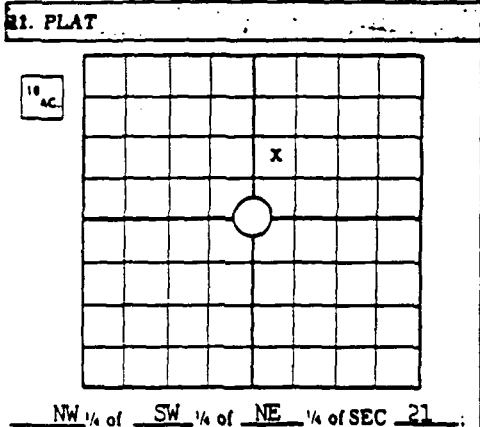
7. NEW WELL CONSTRUCTION DATA  
Dates: Started April 1, 1981 Completed April 4, 1981  
Contractor Hemphill Corporation  
Driller Henkle Drilling & Supply Co., Inc.  
Diameter Hole 15 5/8 in. Total Depth 827 ft.  
  
CASING RECORD  
Diameter 8 5/8 in. From 0 ft. To 8-2 ft.  
Surface Seal: ☒ Yes ☐ No Type: Cement Grout  
Depth of Seal: 508 ft.  
Gravel Packed: Colorado Silica Sand  
Gravel Packed From 508 ft. to 824 ft.  
Amount Used: 17 ton  
  
PERFORATION RECORD  
Type S. S. Continuous Slot 786' - 818' 728' - 738'  
Size 8 5/8 From 700 - 714 ft. To 666 - 680 ft.  
" From 626 - 650 ft. To 594 - 602 ft.  
" From 538 - 556 ft.

8. WELL TEST DATA  
Static Water Level Below Land Surface \_\_\_\_\_ ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality Hemphill Corp. tested well and installed pump.  
  
BAILER TEST  
Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.  
Size of Bailer: \_\_\_\_\_ gal.  
  
PUMPING TEST  
Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA  
Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK  
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Henkle Drilling & Supply Co., Inc. License # W.D. 120  
Address Box 639 Garden City, Ks. Phone # 316-277-2389  
Signed Bernard J. Rickman Date 7-2-81



12. PUMP INFORMATION  
Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.





White - Water Resources Board  
Canary - Drillers Copy  
Pink - Drillers Copy

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St. P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. 18  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_  
FIM \_\_\_\_\_

LEGAL DESCRIPTION OF WELL

(b) (9)

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

6. LOG

Material	From	To	Notes
Soil	0	71	
Red Mud	71	80	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 22 July 83 Completed 22 July 83  
Contractor HUMBERT  
Driller DAVID  
Diameter Hole \_\_\_\_\_ in. Total Depth \_\_\_\_\_ ft.

CASING RECORD

Diameter \_\_\_\_\_ in. From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Surface Seal: ☒ Yes ☐ No Type: Steel Casing  
Depth of Seal: 10 ft.  
Gravel Packed: \_\_\_\_\_  
Gravel Packed From 10 ft. to 80 ft.  
Amount Used: ALL

PERFORATION RECORD

Type Slot From 60 ft. To 80 ft.  
Size 4/2 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
" \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface 40 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown 45 ft. After Pumping \_\_\_\_\_ hrs. At 10 gpm.  
Size of Bailer: 7 gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

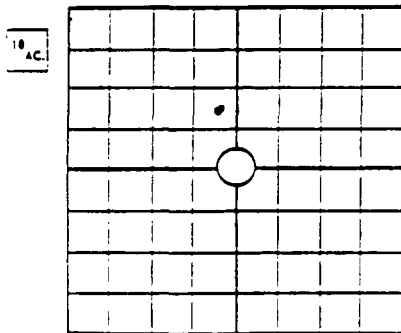
9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. PLAT



NE 1/4 of SE 1/4 of NW 1/4 of SEC 21

TWP 12 S. RGE 4 EIM WIM ECM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowl or Cylinder \_\_\_\_\_ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Humbert Supply & Drilling License # LA-22  
Address 1600 N.W. 10th St. OKC, OK 73107 Phone # 243-3804  
Signed Wm. L. Humbert Date 22 July 83

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53385  
Oklahoma City, Oklahoma 73152

Application No. 19  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_ (Official Use Only)

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL \_\_\_\_\_ PHONE \_\_\_\_\_  
EIM (Circle One)

(b) (9)

3. TYPE OF WORK ☒ New Well ☐ Plugging  
☐ Reconditioning Work  
☐ Test/Monitoring

4. USE ☒ Domestic ☐ Non-Domestic  
☐ Stock ☐ Irrigation  
☐ Test/Monitoring ☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

5. DRILLING METHOD ☐ Rotary ☐ Rev. Rotary  
☐ Cable ☒ Other Hand Drilled  
☐ Air

6. LOG \_\_\_\_\_ 7. LOCATION PERMIT \_\_\_\_\_

Material	From	To	Surf. Level
Clay - sandy clay	0	36	
Water Sand & clay	36	54	

If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

## 8. NEW WELL CONSTRUCTION DATA

DATES: Started 8 MAY Completed 9 MAY  
Contractor JOHN DICKSON  
Driller DAVID  
Diameter Hole 7" in. Total Depth 45' ft.

## CASING RECORD

Inside Diameter 4 1/2" in. From 0 ft. To 45 ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: \_\_\_\_\_ Depth of Seal: 10 ft.

GRAVEL PACKED:  
Gravel Packed From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
Amount Used: 40

## PERFORATION RECORD

Type/Size \_\_\_\_\_  
well screen From 38 ft. To 45 ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

## 9. WELL TEST DATA

Static Water Level Below Land Surface 35' ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield 12 gpm.

## 10. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

## 13. RECONDITIONING WORK

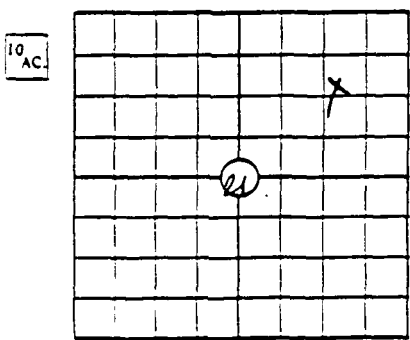
Date Completed \_\_\_\_\_  
☐ Replace Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replace Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

## 14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name JOHN DICKSON License 41037  
Address 4600 N. 4th St. Phone 743-5000  
Signed David C. Dickson Date 15 May 84

## 11. PLAT



S.W. 1/4 of NE 1/4 of NE 1/4 of SEC 21  
(Circle One)  
TWP 12 S. RGE 4 EIM W1M/ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowl or Cylinder \_\_\_\_\_ ft.

MULTI-PURPOSE WATER WELL REPORT

OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_  
PHONE \_\_\_\_\_

(b) (9)

3. TYPE OF WORK  
☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE  
☒ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD  
☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other

6. LOG 7. NEW WELL CONSTRUCTION DATA

Material	From	To	Salinity
Gravel & gravel	0	50	
Red rock	50	60	

Dates: Started 1 Sept 83 Completed same  
Contractor Hindertor  
Driller DAVID  
Diameter Hole 12 in. Total Depth 60 ft.

CASING RECORD

Diameter 4 1/2 in. From 0 ft. To 60 ft.  
Surface Seal: ☒ Yes ☐ No Type: steel & cement  
Depth of Seal: 10 ft.  
Gravel Packed:  
Gravel Packed From 10 ft. to 50 ft.  
Amount Used: fill

PERFORATION RECORD

Type slat From 40 ft. To 60 ft.  
Size 4 1/2 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
" From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

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Oklahoma Water Resources Board

8. WELL TEST DATA

Static Water Level Below Land Surface 20 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown 30 ft. After Pumping \_\_\_\_\_ hrs. At 15 gpm.  
Size of Bailer: 7 gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

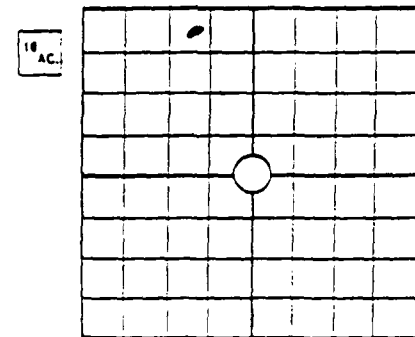
9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. PLAT



NW 1/4 of NW 1/4 of NW 1/4 of SEC 21.

TWP 13N S. RGE 4E EIM/WIM/ECM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Hindertor Supply & Drilling License # 40-33  
Address 4610 N.W. 10th Ave. 73120 Phone # 943-3804  
Signed David Hindertor Date 3 Sept 83

White — Water Resources Board  
 Canary — Drillers Copy  
 Pink — Drillers Copy

STATE OF OKLAHOMA  
 WATER RESOURCES BOARD

1000 N.E. 10th St. P.O. Box 53585  
 Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
 Aquifer \_\_\_\_\_  
 Steam System Code \_\_\_\_\_  
 Use Code \_\_\_\_\_  
 County \_\_\_\_\_

(Official Use Only)

GR  
 NA

MULTI-PURPOSE WATER WELL REPORT

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL \_\_\_\_\_

(b) (9)

3. TYPE OF WORK  
☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE  
☐ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD  
☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other

6. LOG

Material	From	To	Notes
sand & clay	0	20	
sand & gravel	20	50	
Red bed	50	60	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 23 Aug 83 Completed Same  
 Contractor Kindexter Supply  
 Driller DAVID  
 Diameter Hole 12" in. Total Depth 60 ft.

CASING RECORD

Diameter 4 1/2 in. From 0 ft. To 60 ft.  
 Surface Seal: ☒ Yes ☐ No Type: Steel & Cement

Depth of Seal: 10 ft.  
 Gravel Packed:  
 Gravel Packed From 10 ft. to 60 ft.  
 Amount Used: 44

PERFORATION RECORD

Type Slot From 40 ft. To 60 ft.  
 Size 47 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 " \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

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Oklahoma Water Resources Board

8. WELL TEST DATA

Static Water Level Below Land Surface 25' ft.  
 If Artesian: Flows \_\_\_\_\_ gpm.  
 Water Temp. \_\_\_\_\_ °C / Quality \_\_\_\_\_

BAILER TEST

Drawdown 35' ft. After Pumping \_\_\_\_\_ hrs. At 710-5 gpm.  
 Size of Bailer: 7 gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
 Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
 Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 Redeveloped Well By \_\_\_\_\_

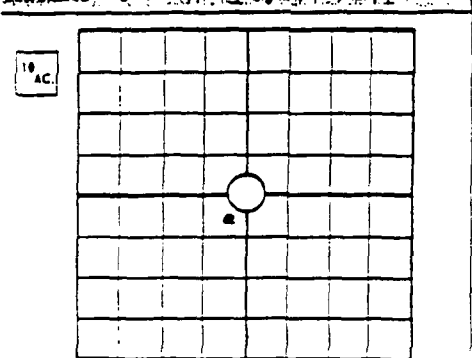
11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Kindexter Supply & Drilling License # 410-33  
 Address 4100 W. 10th Ave OKC 73127 Phone # 949-3884

Signature David C. Smith Date 23 Aug 83

11. PLAT



N6 1/4 of N6 1/4 of S44 1/4 of SEC 21

TWP 12 S. RGE 4 E. W. 10th E. CM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
 Power Source \_\_\_\_\_  
 Rated Capacity \_\_\_\_\_ gpm.  
 Depth of Bore or Cylinder \_\_\_\_\_ ft.

00026

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. 22  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_ (Official Use Only)

OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_  
PHONE \_\_\_\_\_  
EIM (Circle One)

(b) (9)

1. TYPE OF WORK <input checked="" type="checkbox"/> New Well <input type="checkbox"/> Plugging <input type="checkbox"/> Reconditioning Work <input type="checkbox"/> Test Monitoring	4. USE <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Stock <input type="checkbox"/> Test Monitoring	NON-DOMESTIC <input type="checkbox"/> Irrigation <input type="checkbox"/> Municipal <input type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input type="checkbox"/> Other	5. DRILLING METHOD <input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Rev. Rotary <input type="checkbox"/> Cable <input type="checkbox"/> Other <input checked="" type="checkbox"/> Air
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3. LOG <table border="1"><thead><tr><th>Material</th><th>From</th><th>To</th><th>Sum</th></tr></thead><tbody><tr><td>CLAY</td><td>0</td><td>10</td><td></td></tr><tr><td>SAND + fine</td><td>10</td><td>25</td><td></td></tr><tr><td>CLAY + soft spot</td><td>25</td><td>40</td><td></td></tr><tr><td>Shale + soft spot</td><td>40</td><td>60</td><td></td></tr><tr><td>Shale - GLIO 50 ft</td><td>60</td><td>80</td><td></td></tr><tr><td>Clay - soft spot</td><td>80</td><td>100</td><td></td></tr></tbody></table>	Material	From	To	Sum	CLAY	0	10		SAND + fine	10	25		CLAY + soft spot	25	40		Shale + soft spot	40	60		Shale - GLIO 50 ft	60	80		Clay - soft spot	80	100		7. LOCATION PERMIT If this well is Non-Domestic, has this location been permitted? <input type="checkbox"/> Yes <input type="checkbox"/> No Permit No. _____
Material	From	To	Sum																										
CLAY	0	10																											
SAND + fine	10	25																											
CLAY + soft spot	25	40																											
Shale + soft spot	40	60																											
Shale - GLIO 50 ft	60	80																											
Clay - soft spot	80	100																											

8. NEW WELL CONSTRUCTION DATA  
DATES: Started July Completed July, 85  
Contractor Pointexter Drilling  
Driller 1908 NW 37th  
Diameter Hole 8" in. Total Depth 100 ft.

CASING RECORD  
Diameter 4 1/2 in. From 0 ft. To 90 ft.  
Inside \_\_\_\_\_ in. \_\_\_\_\_ ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: steel cement Depth of Seal: 6 ft.  
GRAVEL PACKED:  
Gravel Packed From 10 ft. to 100 ft.  
Amount Used: all

PERFORATION RECORD  
Type Size  
Slot 4 1/2 From 25 ft. To 30 ft.  
From 30 ft. To 55 ft.  
From 55 ft. To 80 ft.  
From 80 ft. To 100 ft.

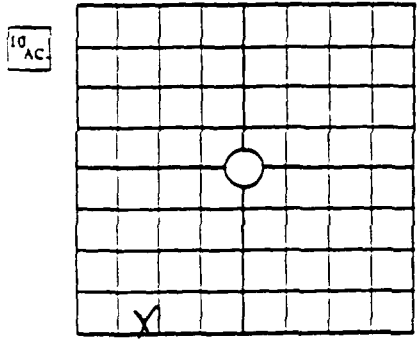
9. WELL TEST DATA  
Static Water Level Below Land Surface 25 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield \_\_\_\_\_ gpm. X

10. PLUGGING DATA  
Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK  
Date Completed \_\_\_\_\_  
☐ Replace Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

14. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Pointexter Drilling License # WC-33  
Address 1908 NW 37th Phone # 942-3824  
Signed Charles B. Pointexter Date 24 July 85

## 11. PLAT



SE 1/4 of SW 1/4 of SEC 22  
(Circle One)  
TWP 12 S. RGE 4 EIM W1M, ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bore or Cylinder \_\_\_\_\_ ft.

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0002

MULTI-PURPOSE WATER WELL REPORT

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL \_\_\_\_\_ PHONE \_\_\_\_\_  
EIM \_\_\_\_\_

(b) (9)

3. TYPE OF WORK

☒ New Well ☒ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☒ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

6. LOG

Material	From	To	Notes
Gravel & Sand	0	17	
Shale	17	160	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 27 June 84 Completed same  
Contractor David's Supply  
Driller David  
Diameter Hole 4 3/4 in. Total Depth 160 ft.

CASING RECORD

Diameter 4 3/4 in. From 0 ft. To 22 ft.  
Surface Seal: ☒ Yes ☐ No Type: Grout  
Depth of Seal: 22 ft.  
Gravel Packed: \_\_\_\_\_  
Gravel Packed From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
Amount Used: \_\_\_\_\_

PERFORATION RECORD

Type \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Size \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
" \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

8. WELL TEST DATA

Static Water Level Below Land Surface \_\_\_\_\_ ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At Day gpm.  
Size of Bailer: \_\_\_\_\_ gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged 27 June  
Backfilled With Grout Material To 20' ft.  
Grouted or Cemented From 20' ft. To 160' ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

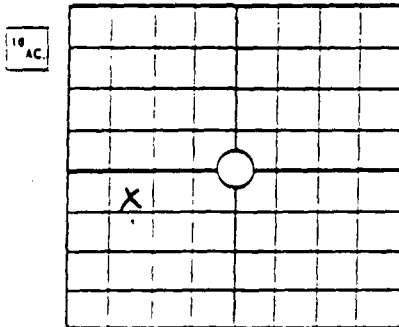
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name David's Supply License # WD-33  
Address 1610 N. 10th St. OKC 73107 Phone # 949-3824  
Signed David's Supply Date 27 June 84

11. PLAT



N 1/4 of 14 1/4 of SW 1/4 of SEC 23.

TWP 12 S RGE 4 E EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.



MULTI PURPOSE WATER WELL REPORT

(Official Use Only)

OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL

EIM

(b) (9)

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☒ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other

6. LOG

Material	From	To	Notes
Gravel Wash	0	120	

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7. NEW WELL CONSTRUCTION DATA

Dates: Started 3 Mar 84 Completed same  
Contractor Indeher Supply  
Driller DAVID  
Diameter Hole 4 1/4 in. Total Depth 122 ft.

CASING RECORD

Diameter 4 1/4 in. From 0 ft. To 12 ft.  
Surface Seal: ☒ Yes ☐ No Type: steel cement  
Depth of Seal: 10 ft.  
Gravel Packed:  
Gravel Packed From 10 ft. to 120 ft.  
Amount Used: 221

PERFORATION RECORD

Type slot From 40 ft. To 45 ft.  
Size 4 1/2 From 65 ft. To 70 ft.  
" From 84 ft. To 90 ft.  
" 10 120

8. WELL TEST DATA

Static Water Level Below Land Surface 40 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown 110' ft. After Pumping \_\_\_\_\_ hrs. At 8 gpm.  
Size of Bailer: 17 gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

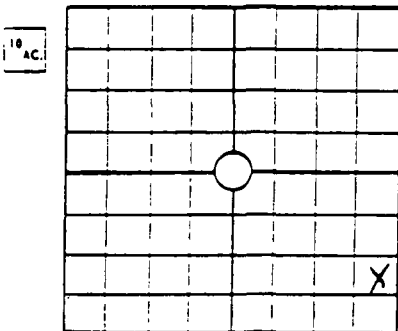
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Indeher Supply License # WD-33  
Address 4607 N.W. 10th Ave OKC OK 73127 Phone # 243-3804  
Signed David C. [Signature] Date 11 Mar 84

11. PLAT



NE 1/4 of SE 1/4 of SE 1/4 of SEC 21

TWP 13 S. RGE 4 EIM W1MECM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

00021

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- Drillers Copy

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10TH STREET, P.O. BOX 53585  
OKLAHOMA CITY, OKLAHOMA 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_ PHONE \_\_\_\_\_

GENERAL DESCRIPTION OF WELL

(b) (9)

<p>TYPE OF WORK</p> <p><input type="checkbox"/> New Well <input checked="" type="checkbox"/> Plugging <input type="checkbox"/> Conditioning Work <input type="checkbox"/> Test</p>	<p>4. PROPOSED / PAST USE</p> <p><input type="checkbox"/> Domestic <input type="checkbox"/> Irrigation <input type="checkbox"/> Stock <input type="checkbox"/> Municipal <input type="checkbox"/> Industrial <input type="checkbox"/> Test</p>	<p>5. DRILLING METHOD</p> <p><input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Rev. Rotary <input type="checkbox"/> Cable <input type="checkbox"/> Other _____</p>
--	--	--

Material	From	To	Remarks
well	0	140	

Dates: Started 2 Mar 84 Completed Same  
Contractor Windexter Supply  
Driller Davis  
Diameter Hole 6 3/4 in. Total Depth 140 ft.

CASING RECORD

Diameter	From	To
_____ in.	_____ ft.	_____ ft.
_____ in.	_____ ft.	_____ ft.

Surface Seal: ☐ Yes ☐ No Type: \_\_\_\_\_  
Depth of Seal: \_\_\_\_\_ ft.  
Gravel Packed: \_\_\_\_\_  
Gravel Packed From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
Amount Used: \_\_\_\_\_

PERFORATION RECORD

Type \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Size \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
" \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

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Oklahoma Water Resources Board

Static Water Level Below Land Surface \_\_\_\_\_ ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

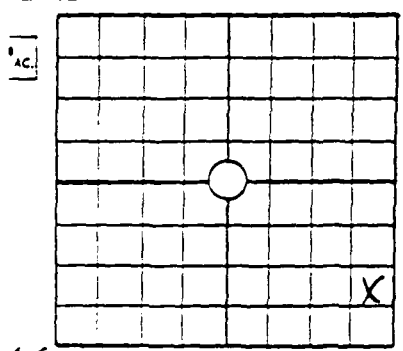
Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.  
Size of Bailer: \_\_\_\_\_ gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

Date Plugged 2 Mar 84  
Backfilled With Grout Material To 138 ft.  
Grouted or Cemented From 140 ft. To 138 ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_



NE 1/4 of SE 1/4 of SE 1/4 of SEC 21  
WP 13 S. RGE 4 E1M W1M ECM

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowl or Cylinder \_\_\_\_\_ ft.

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Windexter Supply & Drilling License # WD-33  
Address 4614 N.W. 102nd St. 73122 Phone # 943-3804  
Signed David P. Windexter Date 11 Mar 84

000,000



# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53385  
Oklahoma City, Oklahoma 73152

Application No. 26  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_ PHONE \_\_\_\_\_

## 2. LEGAL DESCRIPTION OF WELL

EIM (Circle One)

(b) (9)

## 3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work  
☐ Test Monitoring

## 4. USE

☒ Domestic  
☐ Stock  
☐ Test Monitoring

## NON-DOMESTIC

☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

## 5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other  
☐ Air

## 6. LOG

Material	From	To	Notes
Clay	0	12	
Rock	12	28	
Shale	28	54	
clay	54	67	
Shale	67	78	
clay	78	80	

## 7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. \_\_\_\_\_

## 8. NEW WELL CONSTRUCTION DATA

DATES: Started 6-14-85 Completed 6-14-85  
Contractor ELL Tee Supply  
Driller Lowell Sisk  
Diameter Hole 7 in. Total Depth 80 ft.

## CASING RECORD

Inside Diameter 4 1/2 in. From 4 ft. To 80 ft.  
Outside 6 in. From 0 ft. To 10 ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: Steel Depth of Seal: 10 ft.

## GRAVEL PACKED:

Gravel Packed From 10 ft. to 80 ft.  
Amount Used: 750 ft.

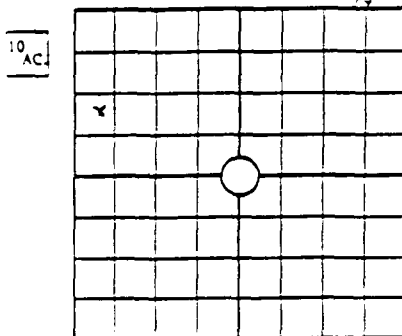
## PERFORATION RECORD

Type Size  
Pvc 4 1/2 From 65 ft. To 75 ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

## 9. WELL TEST DATA

Static Water Level Below Land Surface 28 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield 5 gpm.

## 11. PLAT



NW 1/4 of SW 1/4 of NW 1/4 of SEC 29  
TWP 13 S. RGE 4 EIM (W) ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowl or Cylinder \_\_\_\_\_ ft.

## 10. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

## 13. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replace Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

## 14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Lowell T Sisk License WD 268  
Address Chandler OK Phone 258-0118  
Signed Lowell T Sisk Date 7-13-85

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
Official Use Only

27

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_ PHONE \_\_\_\_\_

(b) (9)

3. TYPE OF WORK <input checked="" type="checkbox"/> New Well <input type="checkbox"/> Plugging <input type="checkbox"/> Reconditioning Work <input type="checkbox"/> Test-Monitoring	4. USE <input type="checkbox"/> Domestic <input type="checkbox"/> Stock <input type="checkbox"/> Test-Monitoring	NON-DOMESTIC <input type="checkbox"/> Irrigation <input type="checkbox"/> Municipal <input type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input type="checkbox"/> Other	5. DRILLING METHOD <input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Cable <input type="checkbox"/> Air <input type="checkbox"/> Rev. Rotary <input type="checkbox"/> Other
--	---	---	--

6. LOG

Material	From	To	Notes
Shale & water	0	100	

7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

8. NEW WELL CONSTRUCTION DATA

DATES: Started 22 July, Completed Same  
Contractor Tommy  
Driller DAVID  
Diameter Hole 6.514 in. Total Depth 100 ft.

CASING RECORD

Diameter	From	To
Inside <u>4.5</u> in.	0	100
Outside _____ in.	_____	_____

Cement Grout Surface Seal ☐ Yes ☐ No  
Type of Surface Seal: Steel Cement Depth of Seal: 20 ft.  
GRAVEL PACKED:  
Gravel Packed From 10 ft. to 100 ft.  
Amount Used: all

PERFORATION RECORD

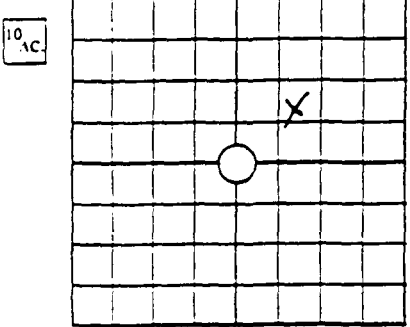
Type Size	From	To
<u>Slot 42</u>	20	25
	45	50
	70	75

9. WELL TEST DATA

Static Water Level Below Land Surface 18 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield 50 gpm.

11. PLAT

10 AC.



10. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item #1. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

NE 1/4 of SW 1/4 of NE 1/4 of SEC 29  
(Circle One)  
TWP 13 N S. RGE 4 E EIM WIM ECM

14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Tommy License # 44133  
Address 4677 N.W. 20th Phone # 795-1544  
Signed David A. Smith Date 22 July

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Howls or Cylinder \_\_\_\_\_ ft.

0003

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53385  
Oklahoma City, Oklahoma 73152

Application No. 28  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_ Official Use Only

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL \_\_\_\_\_ PHONE \_\_\_\_\_  
EIM (Circle One)

(b) (9)

3. TYPE OF WORK ☒ New Well ☐ Plugging  
☐ Reconditioning Work  
☐ Test Monitoring

4. USE ☒ Domestic ☐ Stock ☐ Test Monitoring

NON-DOMESTIC ☐ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ☐ Other

5. DRILLING METHOD ☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other  
☐ Air

6. LOG \_\_\_\_\_ 7. LOCATION PERMIT \_\_\_\_\_

Material	From	To	Spaced
clay	0	15	
Rock	15	20	
Shale	20	55	
clay	55	64	
Shale	64	76	
clay	76	78	

If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

8. NEW WELL CONSTRUCTION DATA

DATES: Started 6-15-85 Completed 6-15-85  
Contractor ELL TEE SUPPLY  
Driller Lawell Sisk  
Diameter (In) 7 Total Depth 78 ft.

CASING RECORD

Diameter	From	To
Inside <u>4 1/2</u> in.	<u>4</u> ft.	<u>78</u> ft.
Outside <u>6</u> in.	<u>0</u> ft.	<u>10</u> ft.

Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: Steel Depth of Seal: 10 ft.

GRAVEL PACKED:  
Gravel Packed From 10 ft. to 78 ft.  
Amount Used: 750 lb

PERFORATION RECORD

Type Size	From	To
<u>PVC 4 1/2</u>	<u>65</u> ft.	<u>75</u> ft.
	ft.	ft.
	ft.	ft.

9. WELL TEST DATA

Static Water Level Below Land Surface 26 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield \_\_\_\_\_ gpm.

10. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. RECONDITIONING WORK

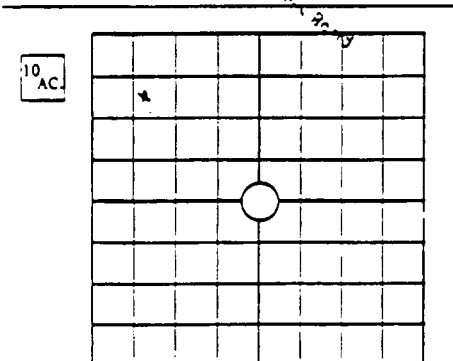
Date Completed \_\_\_\_\_  
☐ Replace Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replace Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

12. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Lawell T Sisk License # WD 268  
Address Chandler OK Phone # 258-0118  
Signed Lawell T Sisk Date 7-13-85

11. PLAT



SE 1/4 of NW 1/4 of SEC 29  
TWP 13 S. RGE 4 EIM. (Circle One)  
EIM. (Circle One)

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowl or Cylinder \_\_\_\_\_ ft.

0003.3

White — Water Resources Board  
 Canary — Drillers Copy  
 Pink — Drillers Copy

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
 WATER RESOURCES BOARD  
 1000 N.E. 10th St., P.O. Box 33585  
 Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
 Aquifer \_\_\_\_\_  
 Steam System Code \_\_\_\_\_  
 Use Code \_\_\_\_\_  
 County \_\_\_\_\_ (Official Use Only)

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_  
 EIM (Circle One)

## 2. LEGAL DESCRIPTION OF WELL

(b) (9)

## 3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work  
☐ Test Monitoring

## 4. USE

☒ Domestic  
☐ Stock  
☐ Test Monitoring

## NON-DOMESTIC

☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

## 5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other  
☐ Air

## 6. LOG

Material	From	To
Clay	0	14
Rock	14	22
Shale	22	58
clay	58	65
Shale	65	76
clay	76	78

## 7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. \_\_\_\_\_

## 8. NEW WELL CONSTRUCTION DATA

DATES: Started 6-13-85 Completed 6-13-85  
 Contractor ELL TESS Supply  
 Driller Lowell T Sisk  
 Diameter Hole 7 in. Total Depth 78 ft.

## CASING RECORD

Diameter 4 1/2 in. From 4 ft. To 78 ft.  
 Outside 6 in. From 0 ft. To 10 ft.  
 Cement Grout Surface Seal ☒ Yes ☐ No  
 Type of Surface Seal: Steel Depth of Seal: 10 ft.  
 GRAVEL PACKED:  
 Gravel Packed From 10 ft. to 78 ft.  
 Amount Used: 750 cu ft.

## PERFORATION RECORD

Type Size  
Pvc 4 1/2 From 65 ft. To 75 ft.  
 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

## 9. WELL TEST DATA

Static Water Level Below Land Surface 24 ft.  
 If Artesian: Flows \_\_\_\_\_ gpm.  
 Approximate Yield 20 gpm.

## 10. PLUGGING DATA

Date Plugged \_\_\_\_\_  
 Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
 Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 Plot Location in Item 11. Show Distances From 2 Section Lines.

## 13. RECONDITIONING WORK

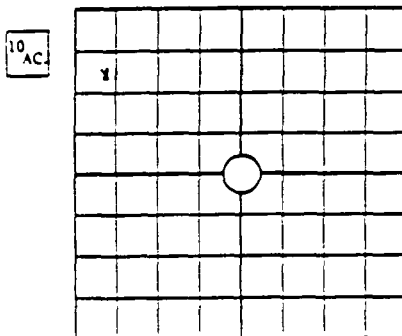
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 Redeveloped Well By \_\_\_\_\_

## 14. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Lowell T Sisk License WD 268  
 Address Chandler OK Phone 258-0118

## 11. PLAT



SW 1/4 of NW 1/4 of NW 1/4 of SEC 27

TWP 13 S. RGE 4 EIMWD ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
 Power Source \_\_\_\_\_  
 Rated Capacity \_\_\_\_\_ gpm.

0006

White — Water Resources Board  
Canary — Drillers Copy  
Pink — Drillers Copy

STATE OF OKLAHOMA  
WATER RESOURCES BOARD

1000 N.E. 10th St. P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_

Official Use Only

MULTI-PURPOSE WATER WELL REPORT

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_

EIM \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL

(b) (9)

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☒ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other

6. LOG

Material	From	To	Notes / Remarks
clay	0	3	
sand	3	53	
shale	53	63	
water sand	63	80	
sand rock	80	94	
clay	94	110	
water sand	110	120	x
sand rock	120	124	
water sand	124	135	x
shale	135	170	
water sand	170	200	x

7. NEW WELL CONSTRUCTION DATA

Dates: Started 11-8-83 Completed 11-8-83  
Contractor Vannoy & Son Drilling Co.  
Driller Leon Vannoy  
Diameter Hole 8 in. Total Depth 200 ft.

CASING RECORD

Diameter	From	To
<u>5 5/8</u> in.	<u>0</u> ft.	<u>10</u> ft.
<u>4</u> in.	<u>10</u> ft.	<u>200</u> ft.

Surface Seal: ☒ Yes ☐ No Type steel & cement  
Depth of Seal: 10 ft.  
Gravel Packed: yes  
Gravel Packed From 100 ft. to 200 ft.  
Amount Used: 2000 lbs.

PERFORATION RECORD

Type slotted From 110 ft. To 130 ft.  
Size .062 From 170 ft. To 200 ft.  
" " From " ft. To " ft.

8. WELL TEST DATA

Static Water Level Below Land Surface \_\_\_\_\_ ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.  
Size of Bailer: \_\_\_\_\_ gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

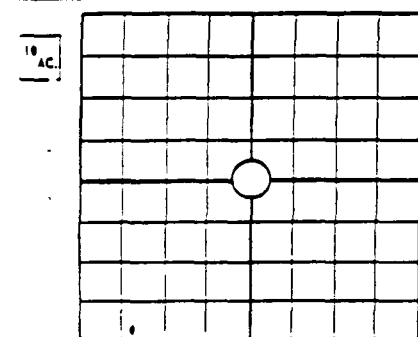
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Vannoy & Son Drilling Co. License # 40 107  
Address P.O. Box 429, Norman Park Phone # 763 2255  
Signed Leon Vannoy Date 11-8-83

11. PLAT



SE 1/4 of SW 1/4 of SEC 33

TWP 13N S. RGE 4W EIM, WIM, ECM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bore or Cylinder \_\_\_\_\_ ft.

White - Water Resources Board  
Canary - Drillers Copy  
Pink - Drillers Copy

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St. P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. 31  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_  
PHONE \_\_\_\_\_

(b) (9)

3. TYPE OF WORK  
☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE  
☒ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD  
☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

6. LOG

Material	From	To	Notes
Soft, well clay	0	50	
Shale	50	80	
Shale & wale	80	120	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 15 Aug 84 Completed 15 Aug 84  
Contractor Perdix Supply  
Driller David  
Diameter Hole 6 3/4 in. Total Depth 120 ft.

CASING RECORD

Diameter	From	To
8" in.	0	10
4 1/2" in.	10	120

Surface Seal: ☒ Yes ☐ No Type: Steel (6) in.  
Depth of Seal: 10 ft.  
Gravel Packed:  
Gravel Packed From 10 ft. to 120 ft.  
Amount Used: ALL

PERFORATION RECORD

Type	From	To
Slot	80	90
Size	110	120

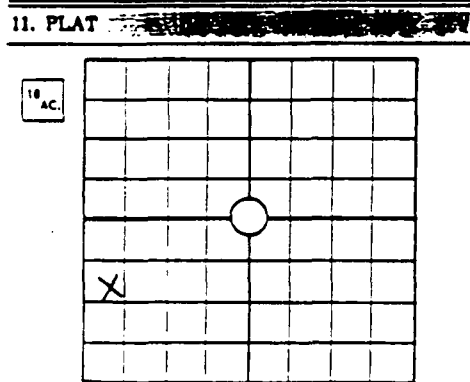
RECEIVED  
AUG 23 1984  
Oklahoma Water Resources Board

8. WELL TEST DATA

Static Water Level Below Land Surface 90 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C / Quality \_\_\_\_\_

BAILER TEST

Drawdown 115 ft. After Pumping \_\_\_\_\_ hrs. At 10 gpm.  
Size of Bailer: 17 gal.



PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

SW 1/4 of NW 1/4 of SW 1/4 of SEC 1  
TWP 12 S. RGE 5 E. 10M. W. 12C.M.

10. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Perdix Supply License # 640-33  
Address 4610 N. 10th St. OKC 73127 Phone # 943-3804  
Signed David Date 18 Aug 84

00036

MULTI-PURPOSE WATER WELL REPORT

NA

1. OWNER City of Bethany ADDRESS Bethany Oklahoma

PHONE

2. LEGAL DESCRIPTION OF WELL

SE 1/4 of SW 1/4 of SE 1/4 of sec. 1 TWP. 12 S. Rge. 5 EIM (WIM) ECM: COUNTY Canadian

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☒ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☐ Rotary ☒ Rev. Rotary  
☐ Cable ☐ Other

LOG			
Material	From	To	Notes / Remarks
Surface sand & clay	0	34	
Sand & Gravel	34	40	x
Clay	40	53	
Sand & gravel	53	59	x

7. NEW WELL CONSTRUCTION DATA

Dates: Started March 26, 1981 Completed March 27, 1981  
Contractor Hemphill Corporation  
Driller Hemke Drilling & Supply Co., Inc.  
Diameter Hole 10 in. Total Depth 61 ft.

CASING RECORD

Diameter 8 5/8 in. From 0 ft. To 61 ft.  
Surface Seal: ☒ Yes ☐ No Type: Cement grout

Depth of Seal: 10 ft.  
Gravel Packed: 8 - 12 Fountain Sand  
Gravel Packed From 10 ft. to 61 ft.  
Amount Used: 3 3/4 Ton

PERFORATION RECORD

Type S. S. Continuous Slot 34 - 40 ft. To 53 - 59 ft.  
Size 8 5/8 From 10 ft. To 61 ft.  
" From 10 ft. To 61 ft.

8. WELL TEST DATA

Hemphill Corporation tested well and installed pump.  
Static Water Level Below Land Surface          ft.  
If Artesian: Flows          gpm.  
Water Temp.          °C / Quality         

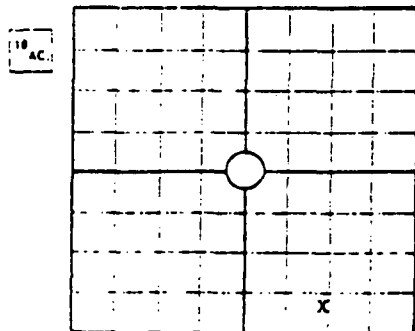
BAILER TEST

Drawdown          ft. After Pumping          hrs. At          gpm.  
Size of Bailer:          gal.

PUMPING TEST

Drawdown          ft. After Pumping          hrs. At          gpm.

11. PLAT



SE 1/4 of SW 1/4 of SE 1/4 of SEC 1

TWP. 12 S. RGE. 5 EIM (WIM) ECM

12. PUMP INFORMATION

Pump Type           
Power Source           
Rated Capacity          gpm.  
Depth of Sows or Cylinder          ft.

9. PLUGGING DATA

Date Plugged           
Backfilled With          Material To          ft.  
Grouted or Cemented From          ft. To          ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed           
☐ Replaced Casing From          ft. To          ft.  
☐ Replaced Screen From          ft. To          ft.  
Deepened Well From          ft. To          ft.  
Redeveloped Well By         

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Hemke Drilling & Supply Co., Inc. License # W.D. 120  
Address Box 539 Garden City, Ks. 67846 Phone # 316-277-235

Signed [Signature] Date July 2, 1981



White - Water Resources Board  
Canary - Drillers Copy  
Pink - Drillers Copy

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
5th Floor Jim Thorpe Building  
Oklahoma City, Oklahoma 73105

Application No. 33  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_

(Official Use Only)

Division of Water Resources  
N.E. 10th & University Blvd.  
Oklahoma City, Oklahoma 73105

MULTI-PURPOSE WATER WELL REPORT

NA

1. OWNER City of Bethany ADDRESS Bethany, Oklahoma

2. LEGAL DESCRIPTION OF WELL

NW  $\frac{1}{4}$  of NW  $\frac{1}{4}$  of SE  $\frac{1}{4}$  of sec. 1 TWP. 12 S. Rge. 5 EIM WIM ECM: COUNTY Canadian

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☒ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☐ Rotary ☒ Rev. Rotary  
☐ Cable ☐ Other

6. LOG			
Material	From	To	Notes
Surface, Sand & clay	0	50	
Sand and Gravel	50	69	X

7. NEW WELL CONSTRUCTION DATA

Dates: Started March 29, 1981 Completed March 30, 1981  
Contractor Hemphill Corporation  
Driller Hankle Drilling & Supply Co., Inc.  
Diameter Hole 18 in. Total Depth 69 ft.

CASING RECORD

Diameter 8 5/8 in. From 0 ft. To 69 ft.

Surface Seal: ☒ Yes ☐ No Type: Cement Grout  
Depth of Seal: 10 ft.  
Gravel Packed: yes  
Gravel Packed From 10 ft. to 69 ft.  
Amount Used: 4 ton

PERFORATION RECORD

Type S. Continuoar Slot 54 ft. To 69 ft.  
Size 8 5/8 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
" \_\_\_\_\_ From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

8. WELL TEST DATA

Hemphill Corporation tested well & installed pump.  
Static Water Level Below Land Surface \_\_\_\_\_ ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp \_\_\_\_\_ °C / F Quality \_\_\_\_\_

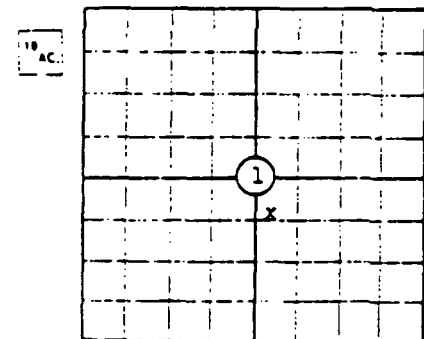
BAILER TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.  
Size of Bailer: \_\_\_\_\_ gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

11. PLAT



NW  $\frac{1}{4}$  of NW  $\frac{1}{4}$  of SE  $\frac{1}{4}$  of SEC 1

TWP. 12 S. RGE. 5 EIM WIM ECM

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Rools or Cylinder \_\_\_\_\_ ft.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

13. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Hankle Drilling & Supply Co. License # W. D. 120  
Address Box 639 Canadian City, Va. 67846 Phone # 316-237-2386  
Signed [Signature] Date July 2, 1981

00038



White - Water Resources Board  
Canary - Drillers Copy  
Pink - Drillers Copy

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 NE 10th St. P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. 34  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_ PHONE \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL

(b) (9)

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☒ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

6. LOG

Material	From	To	Notes
Clay & Sand	0	20	
Sand & Gravel	20	49	
Red Blk	49	60	

7. NEW WELL CONSTRUCTION DATA

Dates: Started 13 July 83 Completed Same  
Contractor Boindexter  
Driller David  
Diameter Hole 12 in. Total Depth 60 ft.

CASING RECORD

Diameter 4 1/2 in. From 0 ft. To 60 ft.  
Surface Seal: ☒ Yes ☐ No Type: \_\_\_\_\_  
Depth of Seal: 10 ft.  
Gravel Packed: \_\_\_\_\_  
Gravel Packed From 10 ft. to 60 ft.  
Amount Used: 400

PERFORATION RECORD

Type Slot From 40 ft. To 60 ft.  
Size 4/32 From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
" From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.

RECEIVED  
JUL 25 1983  
Oklahoma Water Resources Board

8. WELL TEST DATA

Static Water Level Below Land Surface 20 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown 25 ft. After Pumping \_\_\_\_\_ hrs. At 15 gpm.  
Size of Bailer: 7 gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

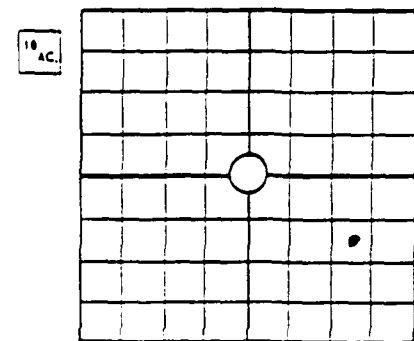
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Boindexter Supply Co License # WD-33  
Address 4610 NW 10th OKC 73127 Phone # 943-3804  
Signed David A. Boindexter Date 16 July 83

11. PLAT



SW of 16 of SE of SEC 12

TWP 12 S. RGE 5 E. M. W. 10 E. 10 N.

12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53583  
Oklahoma City, Oklahoma 73152

Application No. 35  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_ (Official Use Only)

1. OWNER Oklahoma Mortgage Co. ADDRESS 5100 N. Brookline  
Oklahoma City, Ok. PHONE 947-5761

2. LEGAL DESCRIPTION OF WELL Well #1 Lot 14 NE Corner  
SE 1/4 of NE 1/4 of SE 1/4 of sec. 13 TWP 12 S. RGE 5 EIM WIM ECM. COUNTY Canadian

3. TYPE OF WORK  
☒ New Well ☐ Plugging  
☐ Reconditioning Work  
☐ Test/Monitoring

4. USE  
☒ Domestic  
☐ Stock  
☐ Test/Monitoring

NON-DOMESTIC  
☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

5. DRILLING METHOD  
☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other  
☐ Air

6. LOG			
Material	From	To	Sam- pled
Clay Shale	0	20	
Shale	20	40	
Shale	40	60	
Shale into water	80	80	
Shale	80	100	
Water shale	100	120	
water shale water	120	140	
Shale & Watersand	140	160	
Shale & Water	160	180	

7. LOCATION PERMIT  
If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

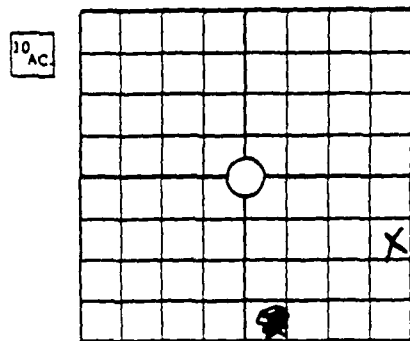
8. NEW WELL CONSTRUCTION DATA  
DATES: Started May 20, 85 Completed May 20, 85  
Contractor Poindexter Supply  
Driller David poindexter  
Diameter Hole 4 1/2 in. Total Depth 180 ft.

CASING RECORD  
Inside 4 1/2 in. From 0 ft. To 180 ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal: Steel & Cement Depth of Seal: 10 ft.  
GRAVEL PACKED:  
Gravel Packed From 0 ft. to 170 ft.  
Amount Used: ALL

PERFORATION RECORD  
Type: Size  
Slot 4 1/2 From 80 ft. To 90 ft.  
From 110 ft. To 120 ft.  
From 140 ft. To 150 ft.  
From 170 ft. To 180 ft.

9. WELL TEST DATA  
Static Water Level Below Land Surface 70 ft.  
If Artesian: Flows \_\_\_\_\_ gpm  
Approximate Yield 20 gpm.

## 11. PLAT



SE 1/4 of NE 1/4 of SE 1/4 of SEC 13  
TWP 12 S. RGE 5 EIM WIM ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bows or Cylinder \_\_\_\_\_ ft.

10. PLUGGING DATA  
Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

13. RECONDITIONING WORK  
Date Completed \_\_\_\_\_  
☐ Replace Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

14. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Poindexter Supply License # WD33  
Address 4610 NW 10th OKC OK Phone # 943-3804  
Signed David Poindexter Date May 20, 85

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. 36  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_ (Official Use Only)

1. OWNER Oklahoma Mortgage Company ADDRESS 5100 N. Brookline  
Oklahoma City Okla. PHONE 947-5761

2. LEGAL DESCRIPTION OF WELL Well #2 Lot 5 NW corner EIM (Circle One)  
SE  $\frac{1}{4}$  of NW  $\frac{1}{4}$  of SE  $\frac{1}{4}$  of sec. 13 TWP. 12 S. RGE. 5 WIM ECM: COUNTY Canadian

## 3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work  
☐ Test/Monitoring

## 4. USE

☒ Domestic  
☐ Stock  
☐ Test Monitoring

## NON-DOMESTIC

☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

## 5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☒ Cable ☐ Other  
☐ Air

## 6. LOG

Material	From	To	Surfaced
Soft wet clay	0	20	
Soft wet clay	20	30	
Shale	30	40	
Shale Water	40	60	
Shale & Water	60	80	
Shale & Water	80	100	
Shale	100	120	
Shale & Water	120	180	

## 7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?

☐ Yes ☐ No Permit No. \_\_\_\_\_

## 8. NEW WELL CONSTRUCTION DATA

DATES: Started May 20, 85 Completed May 20, 85  
Contractor Poindexter Supply  
Driller David Poindexter  
Diameter Hole 4 in. Total Depth 180 ft.

## CASING RECORD

Diameter From To  
Inside 4 in. 0 ft. 180 ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☐ Yes ☐ No  
Type of Surface Seal steel & cement Depth of Seal: 10 ft.  
GRAVEL PACKED:  
Gravel Packed From 0 ft. to 170 ft.  
Amount Used: ALL

## PERFORATION RECORD

Type/Size  
4 From 80 ft. To 90 ft.  
From 110 ft. To 120 ft.  
From 140 ft. To 150 ft.  
From 170 ft. To 180 ft.

## 9. WELL TEST DATA

Static Water Level Below Land Surface 15 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield 30 gpm.

## 10. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

## 13. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

## 14. CERTIFICATION

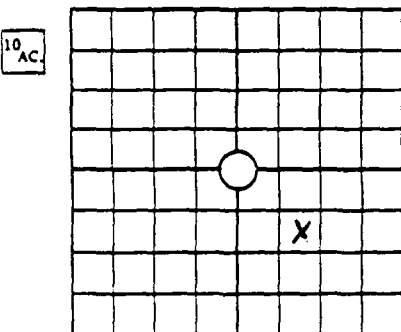
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Poindexter Supply License # WD33  
Address 4610 NW 10th OKC OK Phone 943-3804  
Signed David Poindexter Date 25 May 85

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

## 11. PLAT



SE  $\frac{1}{4}$  of NW  $\frac{1}{4}$  of SE  $\frac{1}{4}$  of SEC 13  
(Circle One)  
TWP. 12 S. RGE. 5 EIM WIM ECM

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53585  
Oklahoma City, Oklahoma 73152

Application No. 37  
Aquifer \_\_\_\_\_  
Stream System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

1. OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_

2. LEGAL DESCRIPTION OF WELL \_\_\_\_\_ PHONE \_\_\_\_\_  
EIM (Circle One)

(b) (9)

3. TYPE OF WORK		4. USE		NON-DOMESTIC		5. DRILLING METHOD	
<input checked="" type="checkbox"/> New Well	<input type="checkbox"/> Plugging	<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Municipal	<input type="checkbox"/> Rotary	<input type="checkbox"/> Rev. Rotary	
<input type="checkbox"/> Reconditioning Work		<input type="checkbox"/> Stock	<input type="checkbox"/> Industrial	<input type="checkbox"/> Commercial	<input type="checkbox"/> Cable	<input type="checkbox"/> Other	
<input type="checkbox"/> Test Monitoring		<input type="checkbox"/> Test Monitoring	<input type="checkbox"/> Other	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Air		

## 6. LOG

Material	From	To	Sample
Clay - Shale	0	20	
Shale	20	40	
"	40	60	
Shale - water	60	80	
Shale water	80	100	
"	100	120	
Water - sand	120	140	
"	140	160	

## 7. LOCATION PERMIT

If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

## 8. NEW WELL CONSTRUCTION DATA

DATES: Started 8 Jan 86 Completed 8 Jan 86  
Contractor Polindert Dilling  
Driller David A. Goodrich  
Diameter Hole 6 3/4 in. Total Depth 150 ft.

### CASING RECORD

Diameter 4 1/2 in. From 0 ft. To 150 ft.  
Inside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal Steel Cement Depth of Seal: 10 ft.  
GRAVEL PACKED:  
Gravel Packed From 10 ft. to 150 ft.  
Amount Used 200

### PERFORATION RECORD

Type/Size 5 1/2" 4 1/2  
From 80 ft. To 90 ft.  
From 110 ft. To 120 ft.  
From 140 ft. To 150 ft.

## 9. WELL TEST DATA

Static Water Level Below Land Surface 65 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield 30 gpm.

## 10. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distance From 2 Section Lines.

## 11. RECONDITIONING WORK

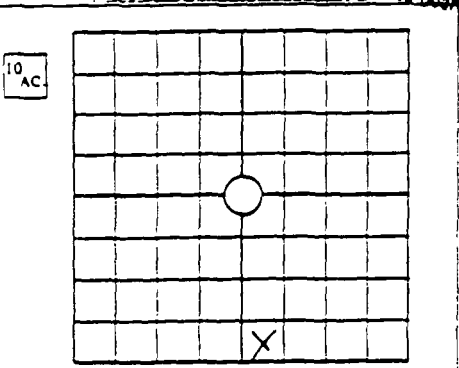
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

## 12. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Polindert Dilling License # W-32  
Address 4614 NW 10 Ave Phone # 943-3804  
Signed David A. Goodrich Date 10/2/86

## 11. PLAT



S4W 1/4 of S4W 1/4 of SE 1/4 of SEC 13  
(Circle One)  
TWP 12 S. RGE 5 EIM W10 ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinder \_\_\_\_\_ ft.

White - Water Resources Board  
 Canary - Drillers Copy  
 Pink - Drillers Copy

STATE OF OKLAHOMA  
 WATER RESOURCES BOARD  
 1000 N.E. 10th St. P.O. Box 53585  
 Oklahoma City, Oklahoma 73152

Application No. \_\_\_\_\_  
 Aquifer \_\_\_\_\_  
 Steam System Code \_\_\_\_\_  
 Use Code \_\_\_\_\_  
 County \_\_\_\_\_  
 (Official Use Only)

## MULTI-PURPOSE WATER WELL REPORT

1. OWNER Okla. Mortgage Co. ADDRESS 5100 Brookshire  
Suite 900, Okla. City, 73112 PHONE 947-5741  
 2. LEGAL DESCRIPTION OF WELL EIM  
SW 1/4 of SE 1/4 of SE 1/4 of sec. 13 TWP. 12 S. Rge. 5 ECM COUNTY Canadian

## 3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

## 4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

## 5. DRILLING METHOD

☐ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other

## 6. LOG

Material	From	To	Notes
Clay - shale	0	20	
Shale - little water	20	40	
Shale	40	50	
with sand	50	150	

## 7. NEW WELL CONSTRUCTION DATA

Dates: Started 27 Aug 84 Completed Same  
 Contractor Boindexter Supply  
 Driller DAVID  
 Diameter Hole 6 3/4 in. Total Depth 150 ft.

## CASING RECORD

Diameter 4 1/2 in. From 0 ft. To 150 ft.  
 Surface Seal: ☒ Yes ☐ No Type: Steel & Cement  
 Depth of Seal: 10 ft.  
 Gravel Packed:  
 Gravel Packed From 10 ft. to 150 ft.  
 Amount Used: all

## PERFORATION RECORD

Type 5 1/2 From 100 ft. To 110 ft.  
 Size 4 1/2 From 130 ft. To 140 ft.  
 " From 140 ft. To 150 ft.

## 8. WELL TEST DATA

Static Water Level Below Land Surface 100 ft.  
 If Artesian: Flows \_\_\_\_\_ gpm.  
 Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

## BAILER TEST

Drawdown 130 ft. After Pumping \_\_\_\_\_ hrs. At 25 gpm.  
 Size of Bailer: 17 gal.

## PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

## 9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
 Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
 Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 Plot Location in Item 11. Show Distances From 2 Section Lines.

## 10. RECONDITIONING WORK

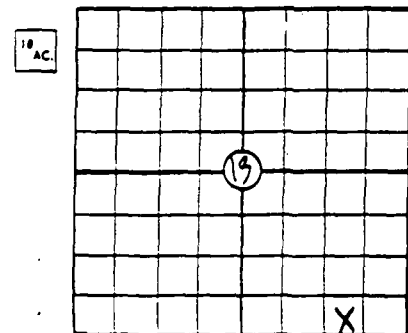
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
 Redeveloped Well By \_\_\_\_\_

## 11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Boindexter Supply License # WD-43  
 Address 4100 N.W. 10th Ave. OKC 73127 Phone # 943-3804  
 Signed David Boindexter Date 28 Aug 84

## 11. PLAT



SW 1/4 of SE 1/4 of SE 1/4 of SEC 13

TWP 12 S. RGE 5 EIM WIM ECM

## 12. PUMP INFORMATION

Pump Type \_\_\_\_\_  
 Power Source \_\_\_\_\_  
 Rated Capacity \_\_\_\_\_ gpm.  
 Depth of Bowls or Cylinder \_\_\_\_\_ ft.

00043

# MULTI-PURPOSE WATER WELL REPORT

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10th St., P.O. Box 53385  
Oklahoma City, Oklahoma 73152

Application No. 39  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

1. OWNER Oklahoma Mortgage ADDRESS 5100 N. Brookline  
Oklahoma City Ok

2. LEGAL DESCRIPTION OF WELL Well # 3 Lot 10 SW corner  
SW 1/4 of SW 1/4 of SE 1/4 of sec. 13 TWP. 12 S. RGE 5 E1M (Circle One) WTM  
ECM: COUNTY Canadian

3. TYPE OF WORK  
☒ New Well ☐ Plugging  
☐ Reconditioning Work  
☐ Test/Monitoring

4. USE  
☒ Domestic  
☐ Stock  
☐ Test/Monitoring

NON-DOMESTIC  
☐ Irrigation  
☐ Municipal  
☐ Industrial  
☐ Commercial  
☐ Other

5. DRILLING METHOD  
☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other  
☒ Air

6. LOG			
Material	From	To	Saturated
Soft clay Shale	0	20	
Shale	20	40	
Shale with water	40	60	
Water sand	60	80	
Water sand & Shale	80	100	
Shale with water	100	120	
Shale and water	120	140	
Water sand	140	160	
Water Shale Water	160	180	

7. LOCATION PERMIT  
If this well is Non-Domestic, has this location been permitted?  
☐ Yes ☐ No Permit No. \_\_\_\_\_

8. NEW WELL CONSTRUCTION DATA  
DATES: Started 21 May 85 Completed 21 May, 85  
Contractor Poindexter Supply  
Driller David Poindexter  
Diameter Hole 4 1/2 in. Total Depth 180 ft.

CASING RECORD  
Diameter 4 1/2 in. From 0 ft. To 180 ft.  
Inside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Outside \_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Cement Grout Surface Seal ☒ Yes ☐ No  
Type of Surface Seal steel & cement Depth of Seal: 10 ft.  
GRAVEL PACKED:  
Gravel Packed From 0 ft. to 170 ft.  
Amount Used: All

PERFORATION RECORD  
Type-Size  
Slot 4 1/2 From 80 ft. To 90 ft.  
From 110 ft. To 120 ft.  
From 140 ft. To 150 ft.  
From 170 ft. To 180 ft.

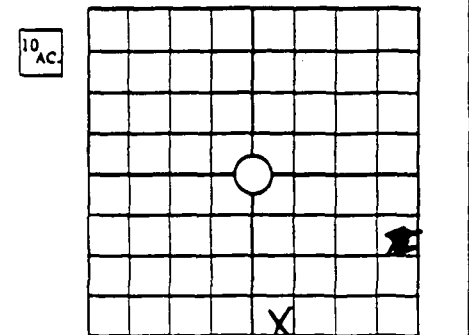
9. WELL TEST DATA  
Static Water Level Below Land Surface 80 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Approximate Yield 25 gpm.

10. PLUGGING DATA  
Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

11. RECONDITIONING WORK  
Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

12. CERTIFICATION  
The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.  
Name Poindexter Supply License # WD33  
Address 4610 N.W. 10th OKC OK Phone # 943-3804  
Signed [Signature] Date 25 May 85

11. PLAT



SW 1/4 of SW 1/4 of SE 1/4 of SEC 13  
(Circle One)  
TWP 12 S. RGE 5 E1M WTM ECM

12. PUMP INFORMATION  
Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bowls or Cylinders \_\_\_\_\_ ft.

00044

White — Water Resources Board  
Canary — Drillers Copy  
Pink — Drillers Copy

STATE OF OKLAHOMA  
WATER RESOURCES BOARD  
1000 N.E. 10TH STREET, P.O. BOX 53585  
OKLAHOMA CITY, OKLAHOMA 73152

Application No. \_\_\_\_\_  
Aquifer \_\_\_\_\_  
Steam System Code \_\_\_\_\_  
Use Code \_\_\_\_\_  
County \_\_\_\_\_  
(Official Use Only)

MULTI-PURPOSE WATER WELL REPORT

OWNER \_\_\_\_\_ ADDRESS \_\_\_\_\_  
PHONE \_\_\_\_\_

(b) (9)

3. TYPE OF WORK

☒ New Well ☐ Plugging  
☐ Reconditioning Work ☐ Test

4. PROPOSED / PAST USE

☐ Domestic ☐ Irrigation ☐ Stock  
☐ Municipal ☐ Industrial ☐ Test

5. DRILLING METHOD

☒ Rotary ☐ Rev. Rotary  
☐ Cable ☐ Other \_\_\_\_\_

6. LOG

Material	From	To	Notes
Clay & shale	0	20	
Shale & water	20	120	

RECEIVED  
MAR 1 1984  
Oklahoma Water Resources Board

7. NEW WELL CONSTRUCTION DATA

Dates: Started 27 Jan 87 Completed same  
Contractor Boindexter Supply & Drilling Co  
Driller Boindexter  
Diameter Hole 6 3/4 in. Total Depth 120 ft.

CASING RECORD

Diameter \_\_\_\_\_ From \_\_\_\_\_ To \_\_\_\_\_  
\_\_\_\_\_ in. \_\_\_\_\_ ft. \_\_\_\_\_ ft.  
Surface Seal: ☒ Yes ☐ No Type: Steel element  
Depth of Seal: 10 ft.  
Gravel Packed: \_\_\_\_\_  
Gravel Packed From 10 ft. to 120 ft.  
Amount Used: 42

PERFORATION RECORD

Type SLP From 40 ft. To 45 ft.  
Size 45 From 65 ft. To 70 ft.  
" \_\_\_\_\_ From 90 ft. To 95 ft.  
115 120

8. WELL TEST DATA

Static Water Level Below Land Surface 35 ft.  
If Artesian: Flows \_\_\_\_\_ gpm.  
Water Temp. \_\_\_\_\_ °C/F Quality \_\_\_\_\_

BAILER TEST

Drawdown 40' ft. After Pumping \_\_\_\_\_ hrs. At 30-40 gpm.  
Size of Bailer: 17 gal.

PUMPING TEST

Drawdown \_\_\_\_\_ ft. After Pumping \_\_\_\_\_ hrs. At \_\_\_\_\_ gpm.

9. PLUGGING DATA

Date Plugged \_\_\_\_\_  
Backfilled With \_\_\_\_\_ Material To \_\_\_\_\_ ft.  
Grouted or Cemented From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Plot Location in Item 11. Show Distances From 2 Section Lines.

10. RECONDITIONING WORK

Date Completed \_\_\_\_\_  
☐ Replaced Casing From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
☐ Replaced Screen From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Deepened Well From \_\_\_\_\_ ft. To \_\_\_\_\_ ft.  
Redeveloped Well By \_\_\_\_\_

11. CERTIFICATION

The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.

Name Boindexter Supply Co License # 410-33  
Address 1618 N.W. 10th St OKC 73127 Phone # 943-3804  
Signed Boindexter Date 27 Jan 87

Pump Type \_\_\_\_\_  
Power Source \_\_\_\_\_  
Rated Capacity \_\_\_\_\_ gpm.  
Depth of Bore or Cylinder \_\_\_\_\_ ft.

USE ADDITIONAL SHEETS IF NECESSARY

00046

## **REFERENCE 22**



# SOIL SURVEY

## Oklahoma County, Oklahoma



UNITED STATES DEPARTMENT OF AGRICULTURE  
Soil Conservation Service  
In cooperation with  
OKLAHOMA AGRICULTURAL EXPERIMENT STATION

Issued February 1969

# SOIL SURVEY OF OKLAHOMA COUNTY, OKLAHOMA

BY CARL F. FISHER AND JOHN V. CHELF, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, IN COOPERATION WITH THE OKLAHOMA AGRICULTURAL EXPERIMENT STATION

OKLAHOMA COUNTY is in the central part of Oklahoma (fig. 1). It has a total land area of 705 square miles, or 451,200 acres. Oklahoma City is the county seat and the largest city in the State. Other towns are Ardmore, Edmond, Bethany, Harrah, and Nicoma Park. In 1960, the county had a population of 439,506, of which less than 1 percent lived on farms.

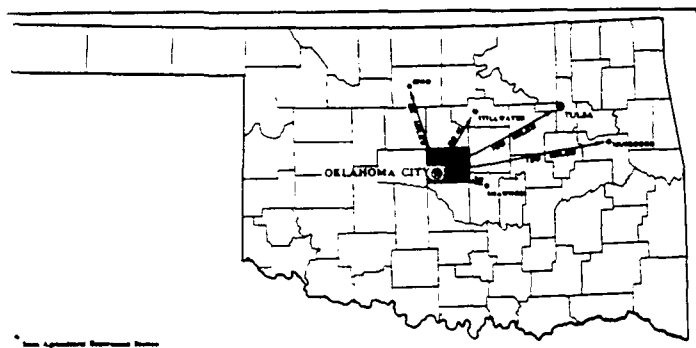


Figure 1.—Location of Oklahoma County in Oklahoma.

The county is part of the Central Lowland physiographic province. It has a subhumid climate, and an average annual rainfall of 31.93 inches. Elevations range from about 1,300 feet in the northwestern part to 850 feet in the southeastern part. Oklahoma City is 1,194 feet above sea level. The North Canadian River, the largest stream, flows across the county.

Homesteaders who came from the Northern States settled in the area that is now Oklahoma County after the area was opened in 1889. Farming was the main occupation and is still one of the principal sources of income. The main farm enterprises are the growing of small grains, mainly winter wheat, and the raising of livestock. Of the total farm income in 1964, the sale of livestock and livestock products accounted for about 65 percent and the sale of crops, about 35 percent. Most of the farmland in the eastern part of the county is in pastures of tame and native grasses. The western part of the county marks the eastern border of the main wheat-growing area of Oklahoma. In 1964, there were about 1,102 farms in Oklahoma County, and their average size was about 214 acres.

Most of the farmland in the county is on uplands consisting of loamy soils that are well drained or somewhat excessively drained. A considerable acreage is made up of

loamy soils on bottom lands. Flooding is a hazard on some of the soils on bottom lands, though the total acreage of soils in the county that require drainage is relatively small. Also small is the acreage of clayey soils.

## General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Oklahoma County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

The five soil associations in Oklahoma County are described briefly in this section. More information about the individual soils in each soil association can be obtained from the detailed soil map at the back of this survey and from the section "Descriptions of the Soils."

### 1. Darnell-Stephenville Association

*Shallow and deep, gently sloping to strongly sloping, loamy soils on wooded uplands*

This association consists of shallow and deep soils on wooded uplands in the eastern two-thirds of the county. These soils are mostly gently sloping to moderately sloping, but they are strongly sloping in places. This association covers about 177,000 acres, or about 45 percent of the farmland in the county. Figure 2 shows a typical area of soil association 1.

The Darnell soils make up about 56 percent of this association; the Stephenville soils, 31 percent; and minor soils, the remaining 13 percent. The chief minor soils are the closely intermingled Vernon and Lucien soils and the Noble, Konawa, and Dougherty soils.

The Darnell soils have a reddish-brown or brown surface layer that is generally fine sandy loam. The surface layer

Soils for Windbreaks and Post Lots." Behavior of the soils when used as sites for structures or as material for construction is discussed in the subsection "Use of Soils in Engineering."

## Bethany Series

The Bethany series consists of deep, dark-colored, nearly level soils on uplands. These soils are in the northwestern and southwestern parts of the county.

In a typical profile, the surface layer is dark grayish-brown, slightly acid silt loam about 14 inches thick. This layer is of granular structure.

The subsoil is about 43 inches thick. It contains less clay and is less compact in its upper part than its lower part. The upper part is dark grayish-brown silty clay loam that has moderate, medium, subangular blocky structure. The lower part is brown light clay of strong to moderate, medium, blocky structure.

The underlying material is brown light clay that is mottled firm, limy, and difficult for plant roots to penetrate.

Bethany soils are naturally well drained. Internal drainage is medium, and permeability is slow. Water-holding capacity and natural fertility are high.

Almost all of the acreage of Bethany soils is cultivated. These soils are suited to small grains, sorghums, cotton, legumes, and grasses. Winter wheat is the crop most widely grown.

Typical profile of Bethany silt loam, 0 to 1 percent slopes, in a cultivated field (east side of road, about 1,000 feet north and 100 feet east from the southwest corner of section 28, T. 11 N., R. 4 W.):

- Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) when moist; weak, fine, granular structure; slightly hard when dry, friable when moist; slightly acid; clear boundary; horizon 6 to 10 inches thick.
- A12—6 to 14 inches, dark grayish-brown (10YR 4/2) heavy silt loam, very dark grayish brown (10YR 3/2) when moist; moderate, medium, granular structure; slightly hard when dry, friable when moist; slightly acid; clear boundary; horizon 5 to 10 inches thick.
- B1—14 to 18 inches, dark grayish-brown (10YR 4/2) silty clay loam, dark brown (10YR 3/3) when moist; moderate, medium, subangular blocky structure; hard when dry, firm when moist; neutral; clear boundary; horizon 3 to 8 inches thick.
- B2t—18 to 40 inches, brown (10YR 5/3) light clay, dark brown (10YR 4/3) when moist; strong, medium, blocky structure; very hard when dry, very firm when moist; thick, complete clay films on ped faces; mildly alkaline; gradual boundary; horizon 12 to 26 inches thick.
- B3—40 to 57 inches, brown (10YR 5/3) light clay, dark brown (10YR 4/3) when moist; moderate, medium, blocky structure; very hard when dry, very firm when moist; moderately alkaline; many fine segregated concretions of calcium carbonate; iron and manganese pellets common; gradual boundary; horizon 15 to 20 inches thick.
- C—57 to 64 inches +, brown (7.5YR 5/4) light clay with distinct common, fine and coarse mottles of reddish brown (5YR 4/4); dark brown (7.5YR 4/4) when moist; massive; very hard when dry, very firm when moist; calcareous.

The Ap and A12 horizons are silt loam in most places, but there is some loam in tilled areas. The A12 horizon ranges from dark grayish brown to dark brown in hues of 10YR and 7.5YR. The B2t horizon ranges from dark grayish brown to brown

in a hue of 10YR. Its texture is heavy silty clay loam and light clay. Depth to the B2t horizon ranges from 14 to 24 inches.

Bethany soils have a more clayey B2t horizon than Vanoss and Chickasha soils.

**Bethany silt loam, 0 to 1 percent slopes** (8eA).—This soil has the profile described as typical for the Bethany series. It absorbs water well and releases it readily to crops. Tillage is moderately easy.

This is one of the most desirable soils in the county for small grains, and it is well suited to the other crops most commonly grown. All of it, except for a few small areas in native grass, is cultivated. Winter wheat is the main crop, but other small grains, sorghums, cotton, alfalfa, and grasses are also grown.

Management is needed for maintaining soil structure and fertility. All crop residue should be returned to the soil, but excessive tillage should be avoided. Small grains can be grown continuously if crop residues are returned to the soil and adequate fertilizer is applied. (Capability unit I-2; Loamy Prairie range site)

## Breaks-Alluvial Land Complex

Breaks-Alluvial land complex (8k) consists of small non-arable valleys cut into the smoother uplands along the upper reaches of intermittent streams. The sides of the valleys are sloping to steep. Areas of this complex range from 100 to 300 feet in width but are 50 to 150 feet wide in most places.

The soil material on the valley sides varies widely, but in most places is loamy in the surface layer and loamy to clayey in the subsoil and substratum. Color ranges from grayish brown and dark brown to reddish brown, depending on the color of associated soils in the surrounding uplands. Depth to bedrock of sandstone, shale, or both ranges from less than 10 inches to more than 5 feet but is greater than 3 feet in most places. The soil material in the valley floor is loamy, brown to reddish brown, and generally calcareous. Slopes dominantly range from 0 to 12 percent. The vegetation on the valley sides consists mostly of short grasses, though mid grasses grow in areas of the less clayey soils. In other areas, the vegetation on the valley sides consists mostly of tall grasses and some trees found in local areas. This land type is used mostly for permanent pasture. (Capability unit VIe-1; Breaks are in the Red Clay Prairie range site, and Alluvial land is in the Loamy Bottom Land range site)

## Broken Alluvial Land

Broken alluvial land (8r) consists of reddish-brown, friable, loamy alluvium. It lies in a narrow strip along the sides of streams that have cut deep, wide channels. The banks average 10 feet in height, but the steep banks are 15 to 25 feet high. The stream channels range from 6 to 100 feet in width and are wider in the bends of the creeks. Slopes range from 2 to 20 percent.

This land supports a thick stand of trees, mainly elm, cottonwood, hackberry, and pecan. The undergrowth is mixed and includes some shrubs and tall grasses.

This land is suitable for native grasses used for grazing. It is also suitable as a habitat for wildlife.

Further erosion of streambanks can be controlled by avoiding overgrazing and clearing of trees and by prevent

The soils in this group are generally unsuitable for field windbreaks or post lots. They are suitable for farmstead windbreaks where tall trees are not needed and where the trees can be watered in droughty periods with the water supplying the farm.

Trees suitable for farmstead windbreaks on the soils of this group are Siberian elm, Russian mulberry, eastern redcedar, and some strains of Chinese arborvitae. These trees grow much slower on the soils of this group than they do on those of groups 1 and 2. Also, more cultivation and more watering are needed.

#### WOODLAND SUITABILITY GROUP 4

The soils in this woodland suitability group range from shallow to deep and from nearly level to moderately steep. They are noneroded or severely eroded. These soils make up about 20 percent of the farmland in the county. In this group are Lela and Miller soils, Darnell-Stephenville, Miller-Slickspots, and Vernon-Lucien complexes, and Eroded clayey land and Eroded loamy land.

These soils are not suitable for tree plantings in windbreaks or post lots. The survival and growth of trees are limited by many adverse characteristics, mainly salinity, erosion, and shallowness.

### Wildlife and Fish\*

The main areas of wildlife habitat in Oklahoma County are the prairies, the timbered uplands, and the timbered bottom lands. The prairies are in the western one-third of the county, and the timbered uplands are in the eastern two-thirds. The timbered bottom lands occur as narrow bands on both sides of the North Canadian River and Deep Fork. They are also along other large streams and along some drainageways.

Important kinds of wildlife in the county are bobwhite quail, mourning dove, fox squirrel, deer, cottontail and jack rabbit, mink, opossum, skunk, muskrat, and beaver. Small flocks of Rio Grande wild turkey have been released in the county and appear to be successfully established. Predatory animals include coyote, bobcat, red fox, and gray fox. Predatory birds are mostly many kinds of hawks and owls. They are protected by law because they help to control harmful rodents. The large lakes in the county attract waterfowl during the migration season. Many kinds of songbirds live in the county during all seasons. They are protected because of their esthetic value and because they help control some of the harmful insects.

Where habitat is adequate and reproduction of wildlife is normal, most kinds of game can be hunted each year and still maintain their numbers. Bobwhite quail is the most popular game bird. Mourning dove is hunted in stubble fields, in weed fields, and around ponds, but the number of dove taken is limited. These birds migrate locally because the weather is warm during the hunting season. Squirrel hunting is popular in the more heavily wooded areas. Coyote are hunted for sport, but only a few pelts are sold. A few opossum, skunk, muskrat, and mink are trapped for their pelts. Mink is the most valuable furbearer in the county. Hunting waterfowl is important around Lake Hefner and around some of the farm ponds that contain food plants.

Fish in the larger streams include black and white bass, channel, bullhead, and flathead catfish, crappie, carp, buffalo, and species of small sunfish and of minnows. Also, fish have been stocked in many farm ponds and in lakes that have been built for watering livestock and for recreation (fig. 12). A moderate to large amount of bass and channel catfish can be produced where drainage is from a well-vegetated watershed, water is fertile, and a reasonably stable water level is maintained. Most fishing in the county is in Hefner, Overholser, and Hiwassee Lakes and in farm ponds. Bass, bluegill, and channel catfish for stocking suitable ponds are available from Federal and State fish hatcheries.

A convenient way to discuss different kinds of wildlife habitat in the county is by soil associations. The soil associations in this county are described in the section "General Soil Map."

The Darnell-Stephenville association (1) makes up about 45 percent of the farmland in the county. Because of the strong slopes and low fertility, only about 30 percent of the acreage is cultivated. Much of the area is covered with dense stands consisting of post oak, blackjack oak, and oak and hickory. Many areas that were formerly cultivated have reverted naturally to grasses or have been reseeded or sodded. Other areas have been invaded by trees and shrubby vegetation.

The varied plant cover of soil association 1 provides a good habitat for bobwhite quail, deer, furbearers, and other wildlife. Many areas can be easily managed so as to increase the number of wildlife. Some of the practices needed are selective clearing of brush, seeding of plants for wildlife food, and disturbing the soils so as to increase weeds. The closely intermingled Vernon and Lucien soils are not suitable for planting trees and shrubs, but they can be improved as wildlife habitat if they are disked or otherwise disturbed. Grazing of livestock needs to be controlled in this association so that enough cover is left for birds that nest on the ground.

The Renfrow-Vernon-Bethany association (2) makes up about 24 percent of the farmland in the county. Because most of this acreage is cultivated, only a few areas of food and cover are available for wildlife. Wheat is the main crop, and its stubble provides food for mourning doves during a short period in summer. Migrating geese feed on fall-planted wheat. Deer and bobwhite quail feed on the wheat that is adjacent to their cover, which is generally along streams and drainageways. Trees and shrubs can be planted to create wildlife habitat, or to supplement that existing, if the more permeable soils in this association are selected. These plantings must be cultivated and protected until they are established.

The Dale-Canadian-Port association (3) makes up about 16 percent of the farmland in the county. Intensive cultivation of the deep, fertile soils on benches has eliminated much of the desirable wildlife habitat, though some remain in parts of the flood plains that are not desirable for cultivation. The soils of this association are well adapted to many kinds of plantings for wildlife. Because these soils are deep and fertile and are subirrigated in places, plants grow rapidly and produce seed early.

The Dougherty-Norge-Teller association (4) makes up about 9 percent of the farmland in the county. About half of the acreage is cultivated, and the rest is in native grass, is pastured, is idle, or is in many kinds of woody plants.

\* By JEROME F. SYKORA, biologist, Soil Conservation Service.

TABLE 4.—*Engineer*

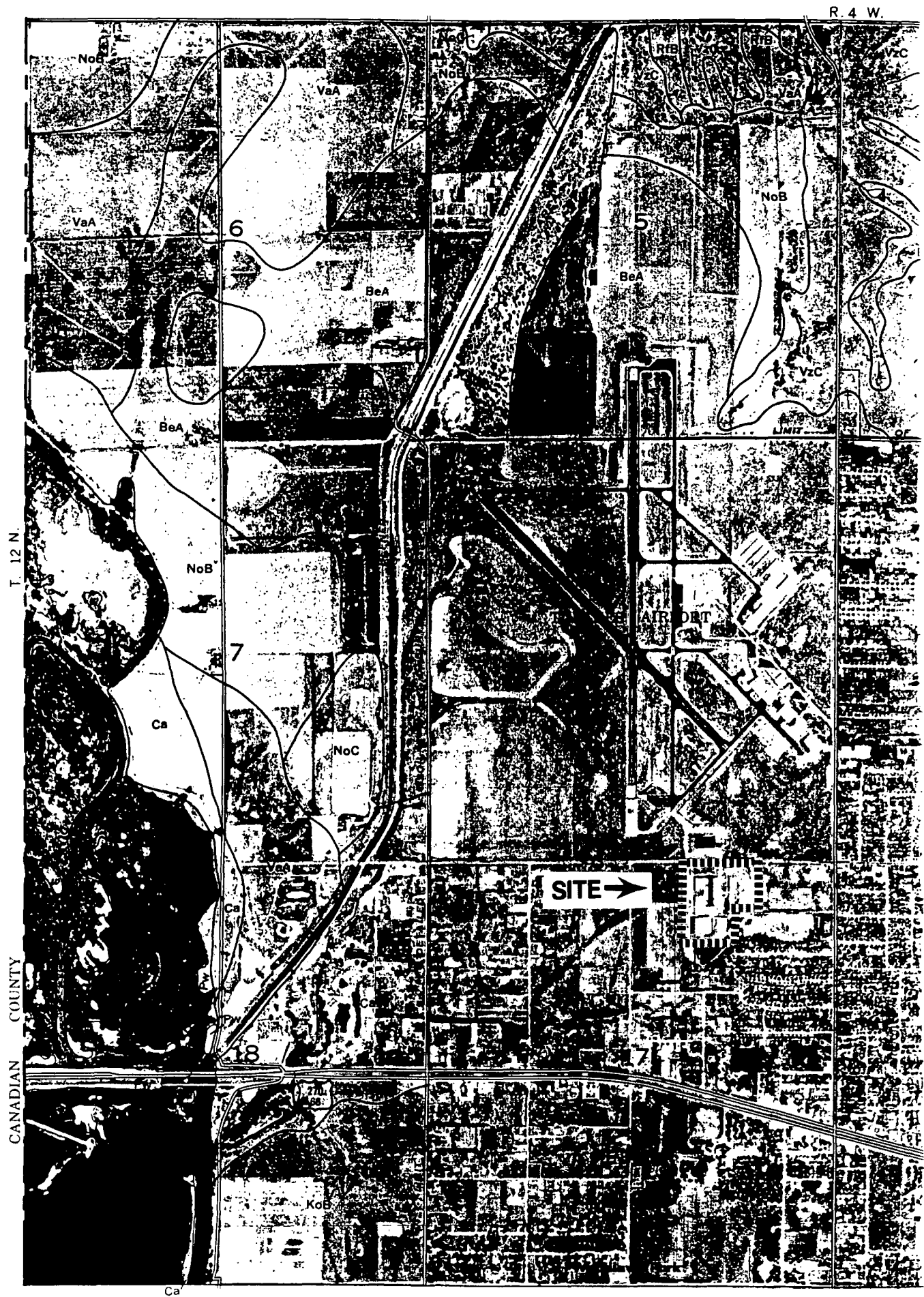
Soil series and map symbol <sup>1</sup>	Suitability as source of—			Soil features affecting—
	Topsoil	Select material	Road fill	Highway location
Bethany (BeA).....	Good to fair to a depth of 1½ feet: Easily eroded on steep slopes.	Unsuitable.....	Poor: Moderate shrink-swell potential; unstable.	Moderate shrink-swell potential; very slow internal drainage: unstable.
Breaks-Alluvial land (Bk)...	Poor: Limited quantity of material.	Poor: Inaccessible and too clayey.	Poor: Limited quantity of material; unstable.	Broken topography; unstable; highly plastic.
Broken alluvial land (Br)...	Fair: Broken and on steep slopes: limited material.	Poor: Variable material.	Poor: Low density; difficult to compact.	Broken topography: unstable when wet; frequently flooded.
Canadian (Ca).....	Poor: Easily eroded on steep slopes.	Good.....	Good.....	Features favorable.....
Canadian-Dale (CdB).....	Poor to good: Areas must be selected.	Unsuitable to good: Areas must be selected.	Poor to good: Selective borrow must be used.	Weak foundation in Dale soil.
Chickasha (ChB).....	Good.....	Poor: Elastic material.	Good to fair.....	Features favorable.....
Crevasse (Cr, Cv).....	Poor: Too sandy.....	Good to fair: Lacks binder in some places.	Good if confined and slopes are stabilized.	Frequent flooding.....
Dale (Dl).....	Good.....	Unsuitable: Too clayey.	Poor: Unstable.....	Nearly level slopes: weak foundation.
Darnell-Stephenville (DsE, DtE3).	Poor: Limited quantity; easily eroded.	Good but limited in quantity.	Good but limited in depth to sandstone.	Sandstone at a depth of 1 to 4 feet.
Dougherty (DuC).....	Poor: Low fertility; easily eroded.	Good.....	Good if entire profile is used.	Erodible soils.....
Eroded clayey land (Es)...	Poor: Shallow, clayey material.	Unsuitable: Too clayey.	Poor: High shrink-swell potential; unstable.	Some steep slopes; highly plastic; numerous gullies.
Eroded loamy land (Et)...	Poor: Low fertility.....	Unsuitable: Clay loam areas are too plastic.	Poor: Unstable.....	Some steep slopes: material unstable when wet.
Grant (GrB).....	Fair: Easily eroded on steep slopes.	Poor: Highly elastic.....	Poor: Requires close control of moisture; unstable.	Unstable slopes: requires good drainage in foundation.
Konawa (KoB).....	Poor: Low fertility; easily eroded.	Good.....	Good if entire profile is used.	Erodible soils.....
Lela (Lc).....	Poor: Too clayey.....	Unsuitable: Highly plastic.	Very poor: Highly plastic; high volume change; unstable.	Highly plastic clay: poor drainage.

See footnote at end of table

ion of soils

## Soil features affecting— Continued

Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir area	Embankment				
Features favorable...	Susceptible to cracking when dry; low shear strength.	Good drainage.....	Slow rate of intake; slow permeability.	Susceptible to ponding in channels.	Features favorable.
Shallow depth; possible seepage at abutment.	Shallow soil in some places; cracks when dry.	Good to excessive drainage.	Broken topography; nonarable land.	Broken topography; nonarable land.	Broken topography; nonarable land.
Flooding; broken topography.	Flooding; broken topography.	Frequent flooding....	Frequent flooding; broken topography.	Frequent flooding; broken topography.	Frequent flooding; broken topography.
High rate of potential seepage; nearly level topography.	High rate of potential seepage; high erodibility.	Good drainage.....	Features favorable....	Nearly level topography.	Nearly level topography.
High rate of potential seepage; nearly level topography.	Features favorable....	Good drainage.....	Variable rate of intake.	Nearly level topography.	Nearly level topography.
Features favorable....	Features favorable....	Good drainage.....	Features favorable....	Features favorable....	Features favorable.
Sandy material; high water table.	High rate of seepage.	Frequent flooding....	Frequent flooding; low water-holding capacity; high rate of intake.	Nonarable soils; frequent flooding.	Nonarable soils; frequent flooding.
Features favorable for dug ponds.	Features favorable....	Good drainage.....	Features favorable....	Nearly level topography.	Nearly level topography.
Sandstone at a depth of 1 to 4 feet; high rate of seepage.	High rate of potential seepage and limited amount of material.	Good drainage to excessive.	Strong slopes; variable depths.	Shallow soils over sandstone.	Shallow, droughty soils.
High rate of seepage.	High erodibility....	Good drainage.....	Wind erosion; hummocky topography.	Hummocky topography; subject to wind erosion.	Soils subject to wind and gully erosion.
Depth to shale may be limited.	Unstable material; cracks when dry.	Good drainage.....	Nonarable land; severely eroded.	Nonarable land; severely eroded.	Vegetation hard to establish; little topsoil; numerous gullies.
Features favorable....	Features favorable....	Good drainage.....	Severely eroded land.	Nonarable land; severely eroded.	Severely eroded land.
Features favorable....	Features favorable....	Good drainage.....	Features favorable....	Features favorable....	Features favorable.
High rate of seepage.	High erodibility....	Good drainage.....	Undulating topography; wind erosion.	Susceptible to wind erosion.	Susceptible to wind and gully erosion.
Features favorable for dug ponds.	Low stability; subject to severe cracking.	Somewhat poor drainage; very slow internal drainage.	Very slow rate of intake; very slow permeability; subject to severe cracking.	Nearly level topography.	Nearly level topography when dry.



## **REFERENCE 23**



## RECORD OF COMMUNICATION

---

TYPE: Telephone Call

DATE: 5-17-91

TIME: 3:30 p.m.

TO: Kevin Jaynes *KJ*  
FIT Biologist  
ICF Technology, Inc.  
Dallas, Texas  
214-744-1641

FROM: Dan Bridgeforth  
Superintendent  
City of Bethany  
Bethany, Oklahoma  
405-789-0920

SUBJECT: City of Bethany Wells Info. and Numbering System.

### SUMMARY OF COMMUNICATION

Mr. Bridgeforth returned my call. I explained to him of the U.S.G.S. database dumpout I had received from Scott Christianson concerning the Garber Wellington Aquifer and the wells located in Township 12-N, Range 4-W. I explained that U.S.G.S. had a fifteen digit code identifying the well and then a summary of its water quality. I needed to cross reference these codes to find the city of Bethany wells. Mr. Bridgeforth said he could do this if I sent Him the information. Mr. Bridgeforth was familiar with the previous FIT work around WPA and asked for the reports on the Air Center. I referred him to the EPA FOI Officer and address.

Mr. Bridgeforth continued to explain that the Bluff Creek Canal actually runs from the south to the north and that a smaller intermittent stream just east of the canal received the run-off from WPA. This stream runs south to Lake Overholser. The Bluff Canal runs from Overholser to Lake Hefner.

## **REFERENCE 24**

## RECORD OF COMMUNICATION


---

TYPE: Telephone Call

DATE: 6-27-91

TIME: 9:30 a.m.

TO: Patrick Yonikas  
OKC Water Dept.  
Oklahoma City, Oklahoma  
405-297-3811

FROM: Kevin Jaynes   
FIT Biologist  
ICF Technology, Inc.  
Dallas, Texas  
214-744-1641

SUBJECT: Oklahoma City Reservoirs and Water Supply

### SUMMARY OF COMMUNICATION

Mr. Yonikas stated that the North Canadian River supplies both Lake Overholser and Lake Hefner. This is controlled by a series of flood gates along the river. When Overholser is to be filled, gates are set to divert flow in , vice-versa for Lake Hefner; the Bluff Creek Canal is flooded to fill Lake Hefner.

The intakes are located at the far northern end of Lake Hefner at the dam and the other at the far southeastern end of Lake Overholser where the North Canadian River exits. Average usage is 80 million gallons a day (mgd) including Lake Draper. Total population served is 460,000 including Draper.

Lake Overholser is used for drinking water only in the summertime.

Average usage for Lake Overholser is 12 mgd and for Hefner is 25 mgd. Approximately 60% of water usage is from the North Canadian via these two lakes.

OKC sells water to all other rural districts and does so at peak times of usage.

Bluff Creek Canal is mostly concrete lined, runs northward to Hefner and has a capacity of 1500 Cubic Feet Per Second (cfs). It has been designed to eliminate most serious runoff into it except what is diverted from the North Canadian River at the flood control gates.

## **REFERENCE 25**

# National Flood Insurance Program Community Status Book

Federal Emergency Management Agency

Federal Insurance Administration  
Washington, D.C. 20472

OKLAHOMA

## Purpose

This book provides information about:

- communities participating in the National Flood Insurance Program (42 U.S.C. 4001-4128) - *Section I*.
- communities which are not participating in the National Flood Insurance Program but have had special flood hazards identified by the Federal Insurance Administration - *Section II*.

Its purpose is to:

- assist lenders in determining whether or not flood insurance must be required as a condition of Federal or federally-related financial assistance.
- assist property owners and insurance agents in determining whether or not flood insurance is available in a particular community, and whether a map showing flood zones is available.
- assist Federal agencies in meeting their responsibilities under Executive Order 11988 (42 FR 26951) to evaluate whether a proposed action will occur in a flood hazard area.
- assist State and local agencies by providing information for flood plain management.
- assist any other members of the general public who may be interested in the information contained within this book.

## Section I

Section I of this book lists communities *PARTICIPATING* in the National Flood Insurance Program. Flood insurance policies for residential and commercial properties and their contents located in the communities listed may be purchased from any insurance agent or broker licensed to sell property or casualty insurance and in good standing in all the states in which the agent is licensed. Agents may obtain information about coverage, rates, etc., by calling the National Flood Insurance Program (800) 638-6620 (toll free), or in the Washington, D.C. metropolitan area 897-5900 or in Maryland (800) 492-6605.

Column 1 - (COMMUNITY NUMBERS). These six digit numbers are either the same number or the same first six digits of the community number (or COMMUNITY PANEL NUMBER) appearing on the FIA flood map for the community. The alphabetic suffix at the end of the number indicates whether the currently effective map is a revision of an earlier map (e.g., "A" normally indicates a first edition, "B" a first revision, etc.) This number and the suffix, if any, must be written on all flood insurance policies.

Column 2 - (COMMUNITY NAME). This indicates the name of the community, followed by the name of the country in which it is located. When the community is a county, only its unincorporated areas are referred to; incorporated areas are listed individually as township, city, village, etc.

Column 3 - This indicates THE DATE OF THE COMMUNITY'S ENTRY INTO THE REGULAR OR EMERGENCY PROGRAM, of the National Flood Insurance Program. The symbol (R) following the date indicates Regular Program; if no parenthetical symbol appears after the date, the community is participating in the Emergency Program.

Column 4 - This indicates THE EFFECTIVE DATE OF THE CURRENTLY EFFECTIVE FLOOD MAP OF THE COMMUNITY. This date also appears on the flood map of the community. If there is no date in this column, a flood map for the community has not yet been published, but the community is still participating in the National Flood Insurance Program.

NOTE: If a date appears in both columns, then the purchase of flood insurance is required as a condition of Federal or federally-related financial assistance for construction or acquisition of buildings (including FHA and VA mortgage guarantees, mortgage loans from federally regulated lending institutions, Federal disaster assistance etc.) located within the special flood hazard areas as shown on the FIA flood maps.

## Section II

Section II of this book lists communities which are *NOT PARTICIPATING* in the National Flood Insurance Program, but which have an FIA flood map delineating the special flood hazard areas in the community.

Column 1 - same as Column 1 described above.

Column 2 - same as Column 2 described above.

Column 3 - HAZARD AREA IDENTIFIED. This is the date of the *first* FIA flood map of that community. There may be other, more recent maps for the community.

Column 4 - DATE ON WHICH SANCTIONS APPLY. Effective on this date, no direct Federal assistance (including FHA or VA mortgage guarantees) can legally be provided for the acquisition or construction of buildings in the special flood hazard areas shown on

the FIA map of this community. If this date will pass before the next publication of this book, the symbol (P) will appear next to the date in Column 4. To obtain up-to-date information on whether the sanction on Federal assistance still applies for their community, call the Federal Emergency Management Agency (202) 646-3444

## Symbols

NSFHA - The community has *no special flood hazard areas* and a flood map for the community has not been published. Although it may not be subject to the 100-year flood, floods of a greater magnitude could occur there. In addition, certain structures may be damaged by local drainage problems.

- L - Minimally Flood Prone, with Flood Hazard Boundary Map converted to Flood Insurance Rate Map by letter, no change in flooding shown on map, no elevation on map.
- M - Minimally Flood Prone, no elevation on map.
- P - Participation deadline will pass before the next publication of the Status Book. Call the above number for up-to-date information after the deadline date.
- R - Entry date into Regular Program.
- S - Suspended from the National Flood Insurance Program. No flood insurance available. Other sanctions apply. For up-to-date information after suspension date, call the above number.
- F - Effective Map is a Flood Insurance Rate Map. Note, however, that the "Hazard Area Identified" date denotes the date of original identification of the special flood hazard area and is not necessarily the date of the most recent Flood Insurance Rate Map.
- W - The community has withdrawn from the National Insurance Program. (Subject to restrictions on lending if community is not in the Program by one year after their initial hazard ID date).
- ★ - Unincorporated areas only.
- # - This community has a map with a *10-digit ID number*. Each map with such a number will be published as one or more Z-fold panels (like road maps). Each map having more than one panel also has an index showing which panels apply to the various sections of a community. Since the 10-digit system permits the revision of individual panels rather than the entire map, the

index also shows the correct suffix of the most current panel for a particular location in the community.

Each time a panel is revised and published, the map index is also revised and republished with a new effective date to reflect the panel revision. For community maps with 10-digit ID numbers, the Status Book gives data relating to the index only. The index must be consulted for information on individual panels.

## State-Owned Property

Flood insurance is not required for *State-owned property* in the following states because the states have submitted to FIA satisfactory self-insurance plans against flood loss:

Florida	North Carolina
Georgia	Oklahoma
Iowa	Oregon
Maine	South Carolina
New York	Tennessee
New Jersey	Vermont

## Publication Schedules

This book is published semiannually and is available in separately-bound copies for each state, or, if nationwide information is needed, in a bound copy for the entire Nation. Copies are free; to get on the distribution list or change your address, number of copies ordered, etc., call 202-646-2789. To report errors found in this book, call (800) 638-7418, (toll free), (800) 492-1676 (toll free) in Maryland only.

Updates to this book are published periodically in the *Federal Register*, which is determinative for the purpose of corrections and legal effect.

## Ordering Flood Maps

FIA flood maps and/or indices may be ordered from:

Federal Emergency Management Agency  
Flood Map Distribution Center  
6930 (A-F) San Tomas Road  
Baltimore, Maryland 21227-6227 or call  
National Flood Insurance Program  
Telephone: (800) 638-6620 (toll free)  
(800) 492-6605 (toll free) in Maryland only

**Federal Emergency Management Agency  
Federal Insurance Administration  
Communities Participating in the National Flood Insurance Program**

**AS OF MAR 01, 1986**

**OKLAHOMA**

Community Number	Community Name	Date of Entry Emergency or Regular Prog.	Date of Current Effective Map (or Map Index)
400173#	ADA, CITY OF	JUL 16, 1980(R)	JUL 16, 1980
400155A	AFTON, TOWN OF	JAN 03, 1986(R) <i>M</i>	JAN 03, 1986
400063#	ALEX, TOWN OF	FEB 02, 1983(R)	FEB 02, 1983
400258B	ALINE, TOWN OF	OCT 15, 1985(R) <i>M</i>	OCT 15, 1985
400174#	ALLEN, TOWN OF	NOV 30, 1982(R) <i>M</i>	NOV 30, 1982
400072#	ALTUS, CITY OF	JUL 02, 1980(R)	JUL 02, 1980
400341	ALVA, CITY OF	MAR 30, 1979(R)	(NSFHA)
400018#	ANADARKO, CITY OF	SEP 17, 1980(R)	AUG 01, 1983
400182	ANTLERS, TOWN OF	MAR 01, 1986(R) <i>L</i>	MAR 01, 1986
400019B	APACHE, CITY OF	MAY 15, 1985(R) <i>M</i>	MAY 15, 1985
400342	ARAPAHO, TOWN OF	APR 15, 1982(R)	(NSFHA)
400031#	ARDMORE, CITY OF	JAN 06, 1982(R)	JAN 06, 1982
400343#	ARKOMA, TOWN OF	APR 19, 1983(R) <i>M</i>	APR 19, 1983
400008#	ATOKA, CITY OF	JUL 20, 1982(R) <i>M</i>	JUL 20, 1982
400147#	AVANT, TOWN OF	JUL 16, 1980(R)	JUL 16, 1980
400148#	BARNSDALL, CITY OF	JUL 16, 1980(R)	JUL 16, 1980
400220#	BARTLESVILLE, CITY OF	JUL 16, 1980(R)	JUL 16, 1980
400009A	BEAVER, TOWN OF	JUL 03, 1975	APR 09, 1976
400345#	BEGGS, CITY OF	SEP 19, 1978(R) <i>M</i>	DEC 29, 1981
400280A	BENNINGTON, TOWN OF	AUG 19, 1985(R) <i>M</i>	AUG 19, 1985
400261A	BESSIE, TOWN OF	MAY 01, 1985(R) <i>M</i>	MAY 01, 1985
400254	BETHANY, CITY OF	JUL 21, 1979(R)	(NSFHA)
400347A	BILLINGS, TOWN OF	JUN 19, 1985(R) <i>M</i>	JUN 19, 1985
400020A	BINGER, TOWN OF	SEP 16, 1975	JAN 16, 1976
400207#	BIXBY, TOWN OF	SEP 28, 1979(R)	SEP 28, 1979
400078#	BLACKWELL, CITY OF	MAY 01, 1980(R)	MAY 01, 1980
400348#	BLAIR, TOWN OF	AUG 03, 1982(R) <i>M</i>	AUG 03, 1982
400101#	BLANCHARD, CITY OF	JAN 03, 1986(R) <i>M</i>	JAN 03, 1986
400262A	BLUEJACKET, TOWN OF	OCT 24, 1978(R) <i>M</i>	OCT 24, 1978
400042B	BOISE CITY, CITY OF	NOV 01, 1985(R) <i>M</i>	NOV 01, 1985
400349A	BOKCHITO, TOWN OF	OCT 19, 1982(R) <i>M</i>	OCT 19, 1982
400350A	BOKOSHE, TOWN OF	APR 17, 1979(R) <i>M</i>	APR 17, 1979
400138A	BOLEY, TOWN OF	FEB 13, 1976	JAN 23, 1976
400488#	BOWLEGS, TOWN OF	AUG 19, 1985(R) <i>M</i>	AUG 19, 1985
400120#	BOYNTON, TOWN OF	SEP 28, 1979(R)	SEP 28, 1979
400121	BRAGGS, TOWN OF	MAY 25, 1978(R)	(NSFHA)
400051#	BRISTOW, CITY OF	MAY 04, 1982(R) <i>M</i>	MAY 04, 1982
400236#	BROKEN ARROW, CITY OF	AUG 17, 1981(R)	SEP 05, 1984
400107B	BROKEN BOW, CITY OF	MAY 20, 1975	NOV 15, 1985
400469B	BROOKSVILLE, CITY OF	AUG 19, 1985(R) <i>M</i>	AUG 19, 1985
400482A	BRYAN COUNTY	JUL 21, 1982	DEC 06, 1977
400351A	BUFFALO, TOWN OF	AUG 25, 1976	DEC 03, 1976
400005	BURLINGTON, TOWN OF	JUL 25, 1975	AUG 23, 1974
400266A	BUTLER, TOWN OF	MAY 15, 1985(R) <i>M</i>	MAY 15, 1985
400267A	BYARS, TOWN OF	JUN 05, 1985(R) <i>M</i>	JUN 05, 1985
400048A	CACHE, TOWN OF	MAR 10, 1975	JUL 30, 1976
400353	CADDO, TOWN OF	MAY 25, 1978(R)	(NSFHA)
400354	CALERA, TOWN OF	MAR 14, 1978	AUG 13, 1976
400269	CALVIN, TOWN OF	SEP 07, 1976	SEP 19, 1975
400271#	CAMERON, TOWN OF	APR 19, 1983(R) <i>M</i>	APR 19, 1983
400485#	CANADIAN COUNTY	FEB 11, 1985	JAN 03, 1986
400272A	CANADIAN, TOWN OF	MAY 15, 1985(R) <i>M</i>	MAY 15, 1985
400012B	CANTON, TOWN OF	MAY 15, 1985(R) <i>M</i>	MAY 15, 1985
400274	CANUTE, TOWN OF	JUN 03, 1984(R)	(NSFHA)
400021#	CARNEGIE, TOWN OF	JUL 20, 1982(R) <i>M</i>	JUL 20, 1982
400276A	CARTER, TOWN OF	MAY 15, 1985(R) <i>M</i>	MAY 15, 1985
400185#	CATOOSA, CITY OF	AUG 01, 1980(R)	AUG 01, 1980
400237	CHANDLER, CITY OF	APR 18, 1975	AUG 13, 1978
400238A	CHECOTAH, CITY OF	JUN 19, 1985(R) <i>M</i>	JUN 19, 1985
400006#	CHEROKEE, CITY OF	DEC 02, 1980(R)	JAN 19, 1982
400183B	CHEYENNE, TOWN OF	AUG 05, 1985(R) <i>M</i>	AUG 05, 1985
400234#	CHICKASHA, CITY OF	SEP 30, 1980(R)	SEP 30, 1980
400357#	CHOCTAW, CITY OF	APR 15, 1981(R)	APR 15, 1981
400115	CHOUTEAU, TOWN OF	JAN 26, 1983(R)	(NSFHA)
405375#	CLAREMORE, CITY OF	AUG 27, 1971(R)	JAN 19, 1982
400358A	CLAYTON, TOWN OF	MAY 01, 1985(R) <i>M</i>	MAY 01, 1985
400280B	CLEO SPRINGS, TOWN OF	JUN 05, 1985(R) <i>M</i>	JUN 05, 1985
400162	CLEVELAND, CITY OF	APR 15, 1982(R)	(NSFHA)
400054#	CLINTON, CITY OF	JUL 02, 1980(R)	JUL 02, 1980
400510	COAL COUNTY	MAR 29, 1982	
400047B	COALGATE, CITY OF	AUG 08, 1978(R) <i>M</i>	AUG 08, 1978
400359	COLBERT, TOWN OF	OCT 26, 1977	APR 09, 1976
400360#	COLLINSVILLE, CITY OF	JUL 02, 1981(R)	JUL 02, 1981
400253#	COLONY, TOWN OF	SEP 10, 1984(R)	FEB 16, 1983
405376C	COMANCHE, CITY OF	DEC 23, 1971(R)	SEP 26, 1975
400156A	COMMERCE, CITY OF	JUL 18, 1985(R) <i>M</i>	JUL 18, 1985
400361A	COPAN, TOWN OF	JUL 26, 1977(R) <i>M</i>	JUL 26, 1977
400362A	COVINGTON, TOWN OF	MAY 01, 1985(R)	MAY 01, 1985
400216	COWETA, CITY OF	MAR 21, 1978	JUN 04, 1976
400097	COYLE, TOWN OF	JUN 07, 1985	AUG 13, 1976
400490#	CREEK COUNTY	MAY 06, 1985	MAY 19, 1981
	PONTOTOC COUNTY	JUL 16, 1980(R)	
	OTTAWA COUNTY	JAN 03, 1986(R) <i>M</i>	
	GRADY COUNTY	FEB 02, 1983(R)	
	ALFALFA COUNTY	OCT 15, 1985(R) <i>M</i>	
	PONTOTOC COUNTY	NOV 30, 1982(R) <i>M</i>	
	JACKSON COUNTY	JUL 02, 1980(R)	
	WOODS COUNTY	MAR 30, 1979(R)	
	CADDO COUNTY	SEP 17, 1980(R)	
	PUSHMATAHA COUNTY	MAR 01, 1986(R) <i>L</i>	
	CADDO COUNTY	MAY 15, 1985(R) <i>M</i>	
	CUSTER COUNTY	APR 15, 1982(R)	
	CARTER COUNTY	JAN 06, 1982(R)	
	LE FLORE COUNTY	APR 19, 1983(R) <i>M</i>	
	ATOKA COUNTY	JUL 20, 1982(R) <i>M</i>	
	OSAGE COUNTY	JUL 16, 1980(R)	
	OSAGE COUNTY	JUL 16, 1980(R)	
	WASHINGTON COUNTY	JUL 16, 1980(R)	
	OSAGE COUNTY		
	BEAVER COUNTY	JUL 03, 1975	
	OKMULGEE COUNTY	SEP 19, 1978(R) <i>M</i>	
	BRYAN COUNTY	AUG 19, 1985(R) <i>M</i>	
	WASHITA COUNTY	MAY 01, 1985(R) <i>M</i>	
	OKLAHOMA COUNTY	JUL 21, 1979(R)	
	NOBLE COUNTY	JUN 19, 1985(R) <i>M</i>	
	CADDO COUNTY	SEP 16, 1975	
	TULSA COUNTY	SEP 28, 1979(R)	
	KAY COUNTY	MAY 01, 1980(R)	
	JACKSON COUNTY	AUG 03, 1982(R) <i>M</i>	
	MCCLAIN COUNTY	JAN 03, 1986(R) <i>M</i>	
	CRAIG COUNTY	OCT 24, 1978(R) <i>M</i>	
	CIMARRON COUNTY	NOV 01, 1985(R) <i>M</i>	
	BRYAN COUNTY	OCT 19, 1982(R) <i>M</i>	
	LE FLORE COUNTY	APR 17, 1979(R) <i>M</i>	
	OKFUSKEE COUNTY	FEB 13, 1976	
	SEMINOLE COUNTY	AUG 19, 1985(R) <i>M</i>	
	MUSKOGEE COUNTY	SEP 28, 1979(R)	
	MUSKOGEE COUNTY	MAY 25, 1978(R)	
	CREEK COUNTY	MAY 04, 1982(R) <i>M</i>	
	TULSA COUNTY	AUG 17, 1981(R)	
	WAGONER COUNTY		
	MCCURTAIN COUNTY	MAY 20, 1975	
	POTTAWATOMIE COUNTY	AUG 19, 1985(R) <i>M</i>	
	BRYAN COUNTY	JUL 21, 1982	
	HARPER COUNTY	AUG 25, 1976	
	ALFALFA COUNTY	JUL 25, 1975	
	CUSTER COUNTY	MAY 15, 1985(R) <i>M</i>	
	MCCLAIN COUNTY	JUN 05, 1985(R) <i>M</i>	
	COMANCHE COUNTY	MAR 10, 1975	
	BRYAN COUNTY	MAY 25, 1978(R)	
	BRYAN COUNTY	MAR 14, 1978	
	HUGHES COUNTY	SEP 07, 1976	
	LE FLORE COUNTY	APR 19, 1983(R) <i>M</i>	
	CANADIAN COUNTY	FEB 11, 1985	
	PITTSBURG COUNTY	MAY 15, 1985(R) <i>M</i>	
	BLAINE COUNTY	MAY 15, 1985(R) <i>M</i>	
	WASHITA COUNTY	JUN 03, 1984(R)	
	CADDO COUNTY	JUL 20, 1982(R) <i>M</i>	
	BECKHAM COUNTY	MAY 15, 1985(R) <i>M</i>	
	ROGERS COUNTY	AUG 01, 1980(R)	
	LINCOLN COUNTY	APR 18, 1975	
	MCINTOSH COUNTY	JUN 19, 1985(R) <i>M</i>	
	ALFALFA COUNTY	DEC 02, 1980(R)	
	ROGER MILLS COUNTY	AUG 05, 1985(R) <i>M</i>	
	GRADY COUNTY	SEP 30, 1980(R)	
	OKLAHOMA COUNTY	APR 15, 1981(R)	
	MAYES COUNTY	JAN 26, 1983(R)	
	ROGERS COUNTY	AUG 27, 1971(R)	
	PUSHMATAHA COUNTY	MAY 01, 1985(R) <i>M</i>	
	MAJOR COUNTY	JUN 05, 1985(R) <i>M</i>	
	PAWNEE COUNTY	APR 15, 1982(R)	
	CUSTER COUNTY	JUL 02, 1980(R)	
	COAL COUNTY	MAR 29, 1982	
	COAL COUNTY	AUG 08, 1978(R) <i>M</i>	
	BRYAN COUNTY	OCT 26, 1977	
	TULSA COUNTY	JUL 02, 1981(R)	
	WASHITA COUNTY	SEP 10, 1984(R)	
	STEPHENS COUNTY	DEC 23, 1971(R)	
	OTTAWA COUNTY	JUL 18, 1985(R) <i>M</i>	
	WASHINGTON COUNTY	JUL 26, 1977(R) <i>M</i>	
	GARFIELD COUNTY	MAY 01, 1985(R)	
	WAGONER COUNTY	MAR 21, 1978	
	LOGAN COUNTY	JUN 07, 1985	
	CREEK COUNTY	MAY 06, 1985	

## **REFERENCE 26**



# TECHNICAL PAPER NO. 40

## RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and  
Return Periods from 1 to 100 Years

Prepared by

DAVID M. HENSHFIELD

Cooperative Studies Section, Hydrologic Services Division

for

Engineering Division, Soil Conservation Service

U.S. Department of Agriculture

THIS ATLAS IS OBSOLETE FOR THE FOLLOWING 11 WESTERN STATES: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

NOAA ATLAS 2: PRECIPITATION-FREQUENCY ATLAS OF THE WESTERN UNITED STATES (GPO: 11 Vols., 1973) supersedes the Technical Paper 40 data for these states.

All but 3 of the 11 state volumes are out of print, and no reprint is presently planned.

Institutions in the eleven western states likely to have copies of these volumes for their state for public inspection are:

US Department of Agriculture Soil Conservation Service Offices  
US Army Corps of Engineers Offices  
Selected University Libraries  
National Weather Service Offices (may also have volumes for adjacent states).  
National Weather Service Forecast Offices (may have all eleven volumes)

Elsewhere, libraries of universities where hydrology and meteorology degree programs are offered may shelve some of the eleven volumes.

The three volumes in print as of 1 Jan 1983 at the GPO are:

Vol.	State	GPO Stock Number	Price
IV	New Mexico	003-017-00158-0	\$10.00
VI	Utah	003-017-00160-1	12.00
VII	Nevada	003-017-00161-0	9.50

The GPO Order Number is 202-781 0010 for VISA and MASTERCARD orders which

### NOTICE

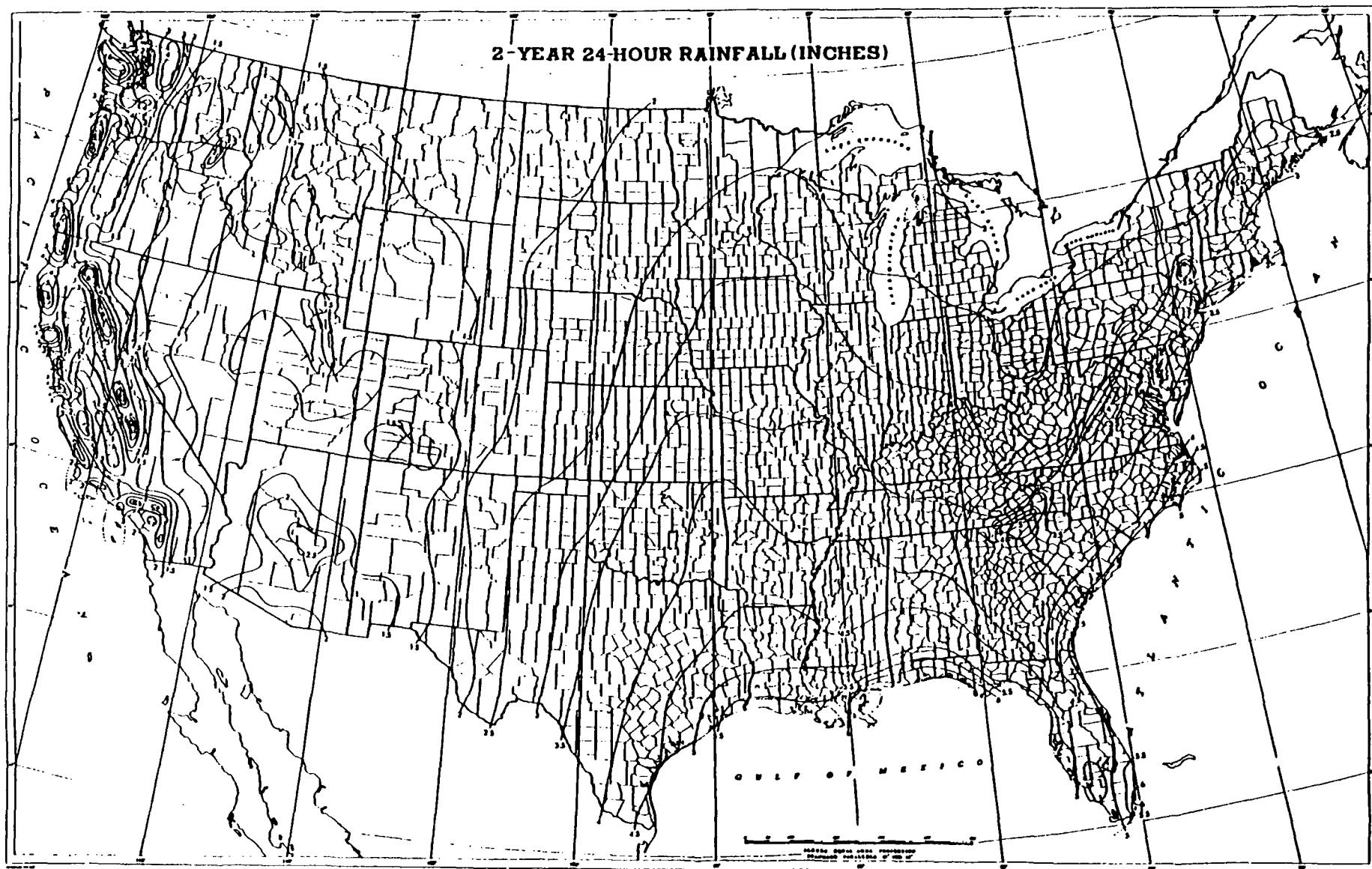
Rainfall-frequency information for durations of 1 hour and less for the Central and Eastern States has been superseded by NOAA Technical Memorandum NWS HYDRO-35 Five to Sixty-Minute Precipitation Frequency for the Eastern and Central United States. This publication (Accession No. PB 272-112/AS) is obtainable from:

National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161



WASHINGTON, D.C.

May 1961



## **REFERENCE 27**

## RECORD OF COMMUNICATION


---

TYPE: Telephone Call

DATE: 6-27-91

TIME: 10:40 a.m.

TO: John Skeen  
Biologist  
Oklahoma Wildlife  
Conservation Department  
OKC, Oklahoma  
405-521-3851

FROM: Kevin Jaynes   
FIT Biologist  
ICF Technology, Inc.  
Dallas, Texas  
214-744-1641

SUBJECT: Stinchcomb Wildlife Refuge and Critical Habitats.

### SUMMARY OF COMMUNICATION

Mr. Skeen indicated that there are no critical habitats in Oklahoma County.

The Stinchcomb Wildlife Refuge is not a federally or state designated area, it is however an important area for birds and often Least Terns are spotted foraging the area.

Another important area which is privately owned is the Rose Lake area located at N.W. 50th and Sara Road. This area is 100 to 200 acres and is important for Least Terns and other migratory birds.

## **REFERENCE 28**

POOR QUALITY ORIGINAL

*Endangered and Threatened  
Species of Texas  
and Oklahoma  
1987*

WILDLIFE 1987B - ENDANGERED



**STATUS:** Threatened (50 FR 21784; May 28, 1985) without critical habitat

**SPECIES DESCRIPTION:** Least terns are small birds with a 20-inch (50 cm) wingspread. Sexes are alike, characterized in the breeding plumage by a black crown, white forehead, grayish back and dorsal wing surfaces, snowy white undersurfaces, orange legs, and a black-tipped yellow bill. Breeding colonies contain from about 5 to 75 nests.

**HABITAT:** Important characteristics of its breeding habitat include: (1) the presence of bare or nearly bare ground on alluvial islands or sandbars for nesting, (2) the availability of food (primarily small fish), and (3) the existence of favorable water levels during the nesting season (so nests remain above water).

**DISTRIBUTION:**

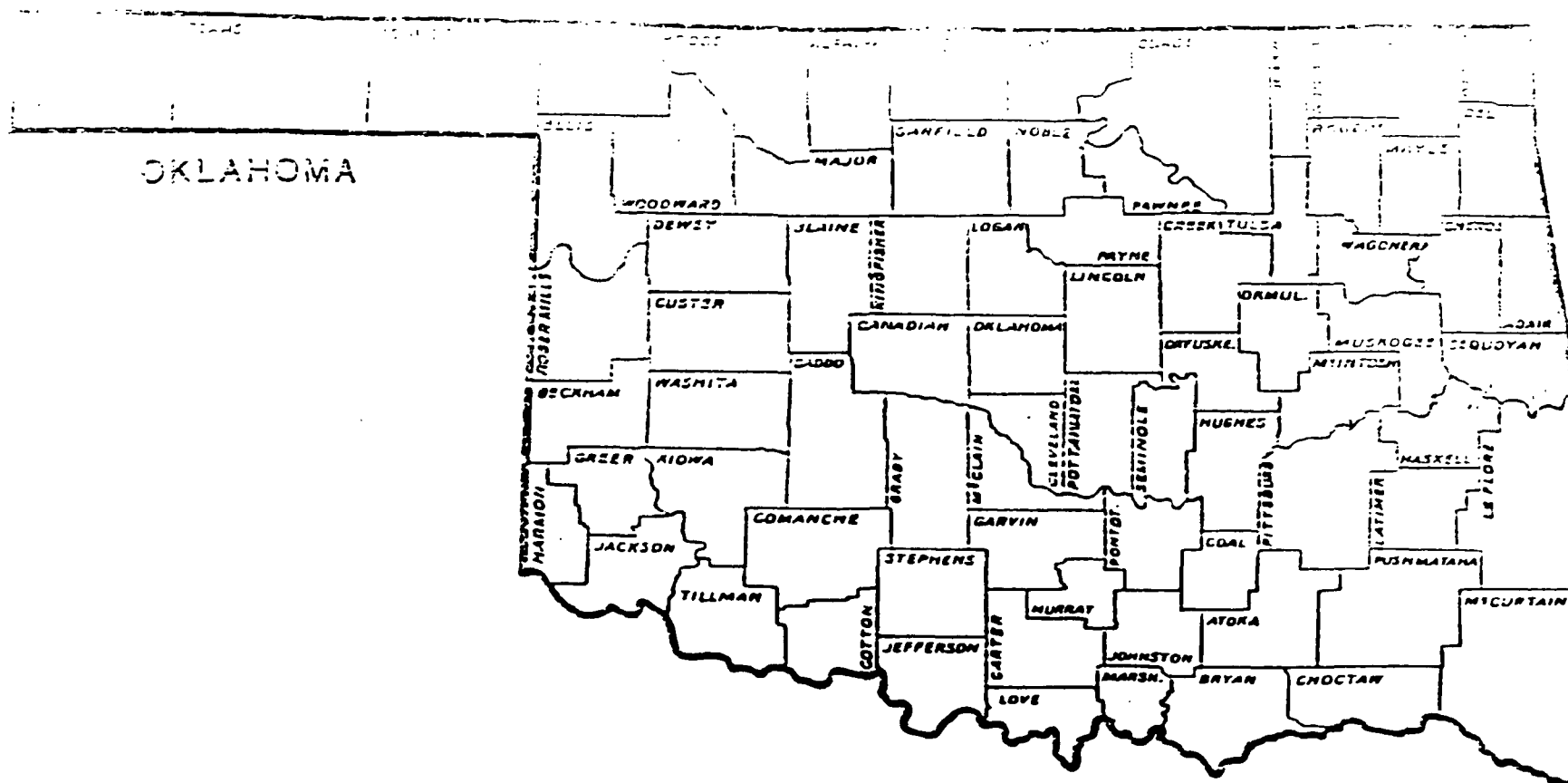
Historic: Sand bars on the Colorado (in Texas), Red, Rio Grande, Arkansas, Missouri, Ohio, and Mississippi River systems; braided rivers of northwest Oklahoma and southwest Kansas; (salt) flats of northwest Oklahoma (Salt Plains National Wildlife Refuge); mud playa lakes in southeastern New Mexico (Bitter Lakes National Wildlife Refuge).

Present: Terns presently occur as small remnant colonies within their historic distribution.

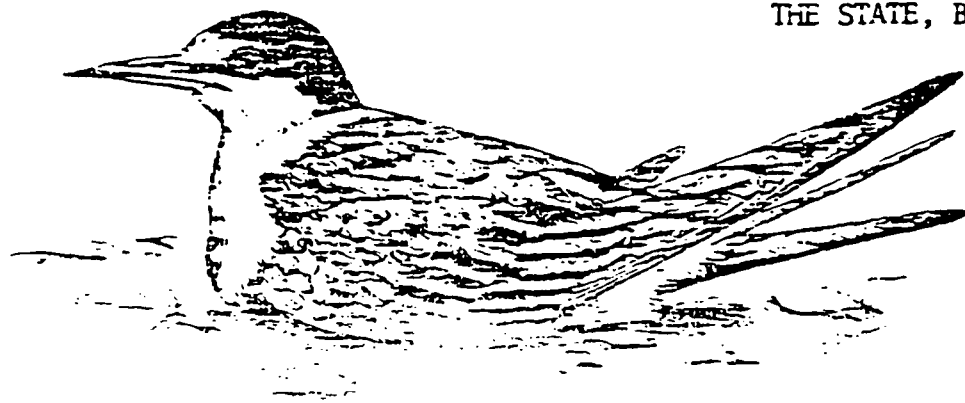
**REASONS FOR DECLINE:** Many nesting areas have been permanently inundated or destroyed by reservoirs and channelization projects. Alteration of natural river or lake dynamics has caused unfavorable vegetational succession on many remaining islands, curtailing their use as nesting sites by terns. Recreational use of sandbars is a major threat to the tern's reproductive success. Release of reservoir water and annual spring floods often inundate nests.

**OTHER INFORMATION:** Recovery plan drafted in 1986. The Service is working with the States of New Mexico, Texas, Oklahoma, and the Bureau of Reclamation to monitor tern populations. The Service is also working with The Nature Conservancy to protect tern habitat along the Arkansas River near Tulsa, Oklahoma, and with the U.S. Army Corps of Engineers to protect tern habitat at Opima Reservoir, northwestern Oklahoma.

**REFERENCES:** Downing 1980, Grover and Knopf 1982, Faanes 1983, Hall 1985, Boyd 1986, USFWS 1986a.



CAN BE FOUND DURING THE BREEDING SEASON THROUGHOUT  
THE STATE, BUT ONLY NEST IN SUITABLE HABITAT



INTERIOR LEAST TER



STATUS: Endangered (32 FR 4001, March 11, 1967; 35 FR 8495, June 2, 1970) with critical habitat (43 FR 20938, May 15, 1978)

SPECIES DESCRIPTION: The tallest American bird; males approach 5 feet tall. A very large, snowy white, long-necked bird with long legs that normally trail behind in flight. Also has black primary feathers, a red crown, and a wedge-shaped patch of black feathers behind the eye.

HABITAT: Marshes, river bottoms, potholes, prairies, cropland. Whooping cranes feed on small grains (corn, wheat, sorghum, barley) in agricultural fields, green forage (alfalfa, winter wheat), aquatic plants (tubers and leaves), insects, crustaceans, and small vertebrate animals.

DISTRIBUTION:

Historic: Originally found over most of North America. In the 19th century the main breeding area was from the Northwest Territories in Canada to the prairie provinces and northern prairie states to Illinois. A non-migratory flock existed in Louisiana, but is now extinct. Wintered in the Carolinas, along the Texas Gulf coast, and the high plateaus of Mexico.

Present: Passes through western Oklahoma on its migration (October-November in the fall, April-May in the spring). Salt Plains NWR, near Jet, Oklahoma, is a very important migration stopover area. Numerous stopover areas exist including the Canadian, Red, and Cimarron Rivers and grain fields. Migrate as singles, pairs, family groups (normally 3) or in small flocks, sometimes in the company of sandhill cranes.

REASONS FOR DECLINE: Destruction of wintering and breeding habitat, shooting, collisions with powerlines and fences, specimen collecting, and human disturbance.

OTHER INFORMATION: The recovery team was appointed in 1976 and first recovery plan published in 1980. The recovery plan was revised in 1986. Protected by Canada and Mexico. Intensive captive-breeding program is being conducted by the Service and by the Canadian Wildlife Service.

REFERENCES: Allen 1971, BEWS 1986f.



## **REFERENCE 29**

## RECORD OF COMMUNICATION

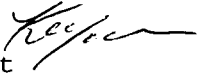
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TYPE: Telephone Call

DATE: 6-27-91

TIME: 9:00 a.m.

TO: Ken Morris  
Oklahoma Water Resources  
Board  
Oklahoma City, Oklahoma  
405-231-2533

FROM: Kevin Jaynes   
FIT Biologist  
ICF Technology, Inc.  
Dallas, Texas  
214-744-1641

SUBJECT: Lake Overholser, Lake Hefner and Stinchcomb Wildlife Refuge.

### SUMMARY OF COMMUNICATION

Mr. Morris indicated that Bluff Creek Canal runs north to Lake Hefner but as far as intakes for the reservoirs, the FIT would have to call the city water resources at 405-297-2533 and talk to Mr. Paul Brum. Mr. Morris stated that they deal on a state level for floodplain management. Mr. Morris indicated that WPA is situated in a Zone C outside of a 500 year floodplain according to FEMA insurance map.

Mr. Morris stated that the Stinchcomb Wildlife Refuge is not a federal sanctioned wetland but is considered a wetland. I would have to call the Oklahoma Wildlife and Fisheries Department for that info.

## **REFERENCE 30**



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## ICF TECHNOLOGY INCORPORATED

TO: File

FROM: Kevin Jaynes, FIT Biologist *KJ*

DATE: October 2, 1991

SUBJ: Screening Site Inspection of Gulfstream Aerospace Corporation  
Bethany, Oklahoma County, Oklahoma  
OKD981518327

During the week of April 1, 1991, the FIT implemented the SSI sampling inspection. The objectives of the sampling mission were to determine the extent of the chromic acid spill, lead contamination and to determine if off-site contaminant migration is occurring.

The FIT met with Bill Humes, Vice-President of Operations, who granted the FIT site access. Mr. Humes informed the FIT that there are 760 employees on-site.

Six low concentration, composite surface soil samples (0 to 6 inches) and three low concentration, composite subsurface soil samples (1 to 2 feet) were collected along the west side roadbed to determine the extent and depth of potential contaminants. Seven low concentration, grab sediment samples and one low concentration, composite subsurface soil sample were collected from drainage ditches both on and off-site and up and downgradient to determine whether off-site contaminant migration is occurring. An additional low concentration, composite surface sample and subsurface sample and a low concentration, grab sediment sample were collected from an area east of the facility to serve as backgrounds for their respective matrices. The relocation of the background samples from an area north of NW 50th Street to the location east of the GAC facility were the only deviations from the workplan. Ground water or surface water samples were not collected.

All soil samples were collected, decontaminated and packaged according to FIT Field Sampling Standard Operating Procedures. All samples were shipped via Federal Express to their respective laboratories.

All on-site activities were conducted according to the Site Safety Plan.

## **REFERENCE 31**

TO: FILE

FROM: Kevin Jaynes *KJ*

SUBJ: Continuing Research Investigation and File Check of Wiley Post Airport, Bethany, Oklahoma (CERCLIS No. OKDO987070059).

DATE: May 10, 1991

The FIT met with representatives of Wiley Post Airport and the Oklahoma Airport Planning and Development Corporation in Oklahoma City to discuss the closure of nine USTs located near hangar facilities at Wiley Post Airport (WPA). WPA is located at N.W. 50th and Rockwell. The FIT met with Lou Dominquez of the Planning and Development Corporation, Wayne Fuller, General Manager of WPA, Dan Spitz, Hydrogeologist, TECHRAD Environmental Services, Inc. and Steve Schuller who is charge of maintenance of the Main Fuel Storage Facility at WPA.

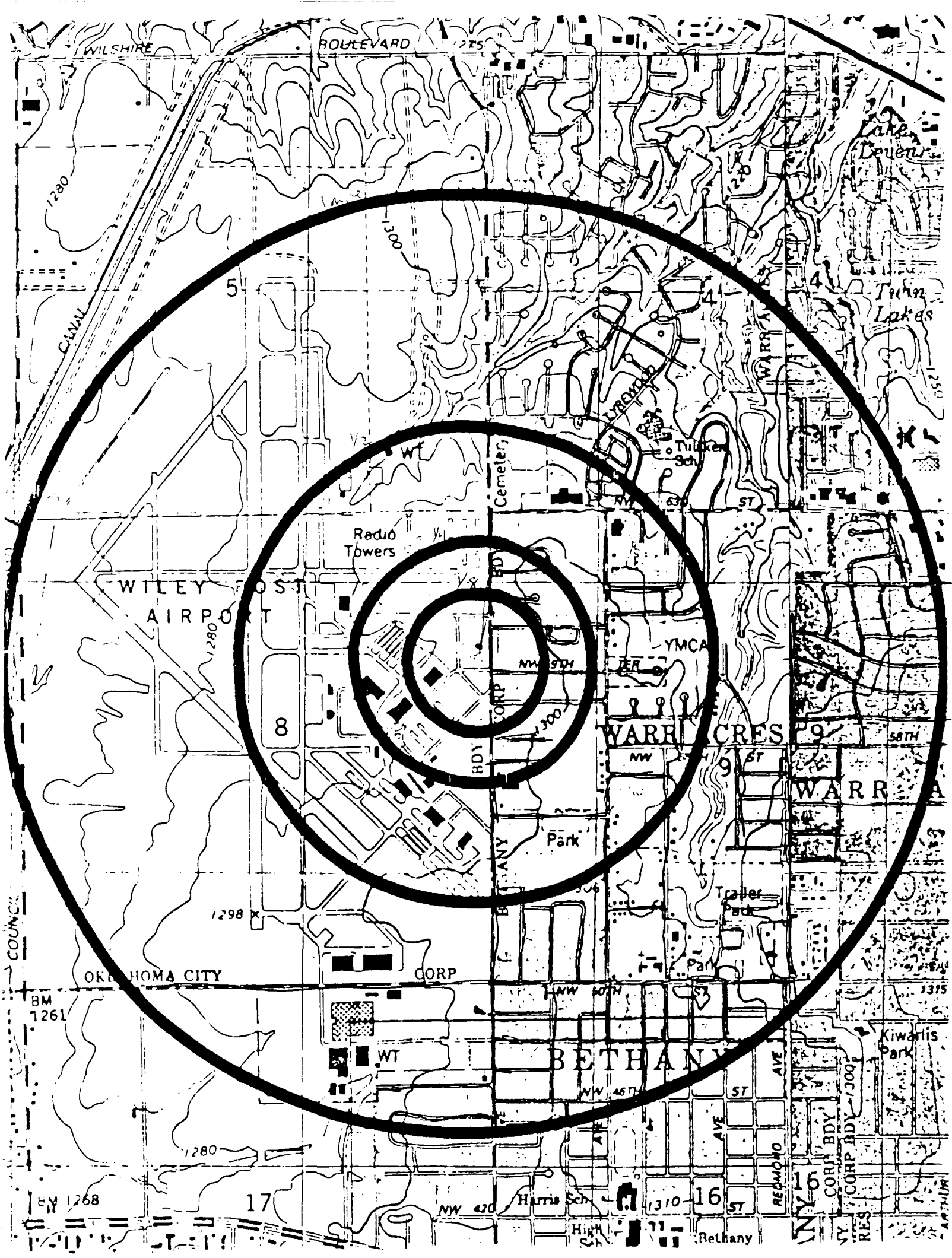
Dan Spitz supplied the FIT with documentation and analytical data on three separate UST closure activities near hangar facilities and one closure that had been completed in the Main Fuel Storage Facility. The pulls were initiated in 1989 because of age, liability and they were no longer needed.

Steve Schuller indicated to the FIT that existing USTs in the Main Fuel Storage Facility are visually inspected annually and if a tank appears suspicious it is considered dead. The tank is then mill tested and the epoxy liners are checked for leaks. Mr. Schuller continued stating that WPA operates under the Federal Aviation Administration Code 139 for commercial airports fuel storage. WPA is not required to do this since no commercial or charter air service is offered.

Mr. Fuller indicated that Guernsey Co. did the oversee contractual work for airport renovations and that TECHRAD was brought in to check the integrity of all remaining USTs and consult in closures.

The FIT then conducted a house count within 1 mile of the WPA Main Fuel Storage Facility. Results from the house count indicate that there were approximately 2,400 homes not including three large 100+ unit apartment complexes.





## **REFERENCE 32**

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# Estimates of Households, for Counties: July 1, 1985

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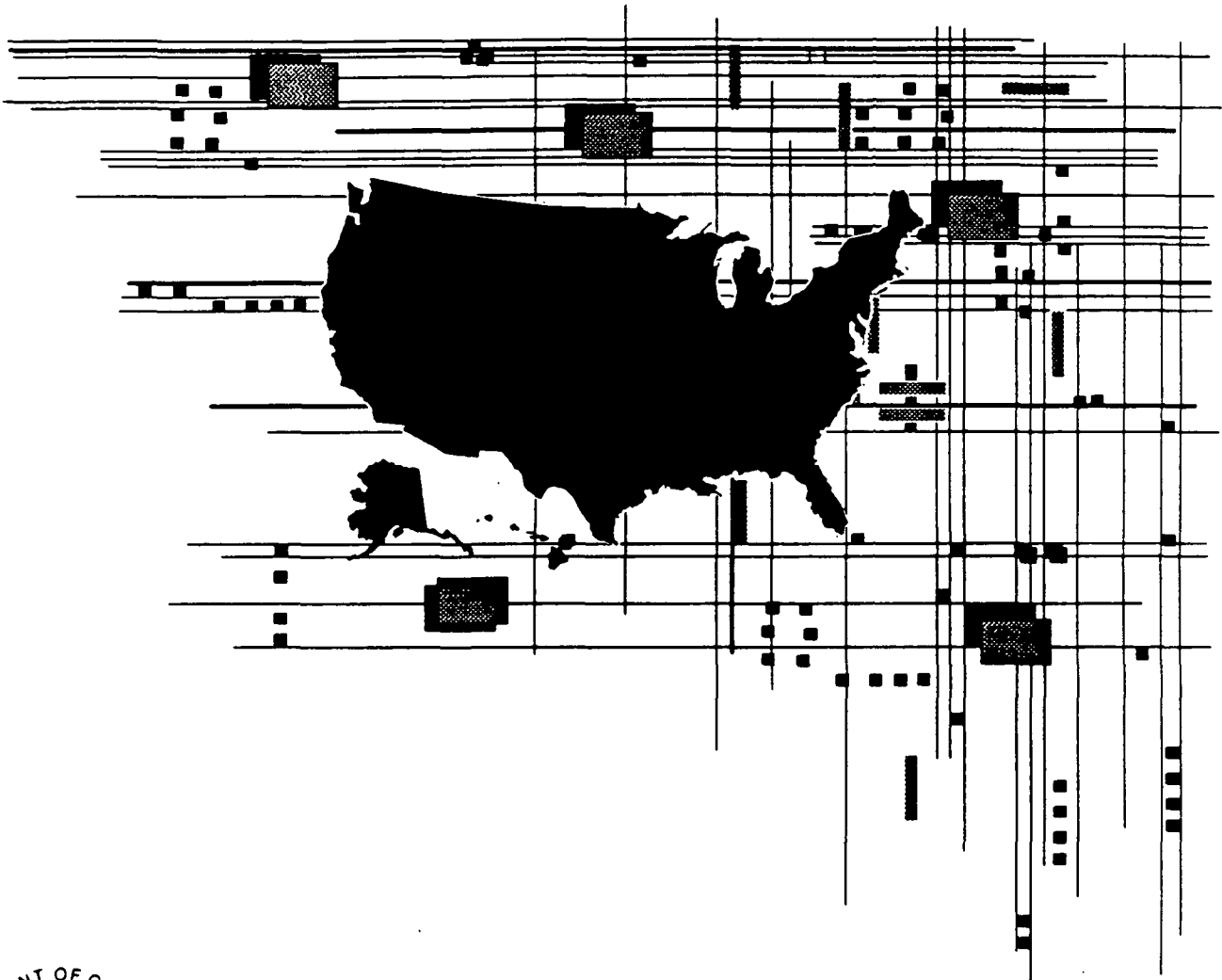


Table 1. Estimates of Households, for Counties: July 1, 1985—Continued

(A dash (-) represents zero or rounds to zero. Estimates are consistent with special censuses since 1980. Corrections to 1980 census counts are not included. See text concerning rounding and average population per household)

State and county	Households				Average population per household		Population			
	July 1, 1985 (estimate)	April 1, 1980 (census)	Change, 1980-85		July 1, 1985 (estimate)	April 1, 1980 (census)	July 1, 1985 (estimate)	April 1, 1980 (census)	Change, 1980-85	
			Number	Percent					Number	Percent
Oklahoma—Continued										
Garvin.....	11,400	10,511	900	8.9	2.53	2.55	30,000	27,856	2,200	7.7
Grady.....	16,300	14,302	2,000	13.8	2.72	2.71	45,000	39,490	5,500	14.0
Grant.....	2,600	2,656	-	-0.8	2.48	2.41	6,600	6,518	100	2.0
Greer.....	2,900	2,868	-	1.2	2.26	2.28	7,000	7,028	-	0.3
Harmon.....	1,800	1,758	-	1.4	2.43	2.47	4,500	4,519	-	-0.3
Harper.....	2,000	1,905	100	3.2	2.39	2.44	4,800	4,715	-	0.9
Haskell.....	4,700	4,191	500	12.5	2.51	2.61	11,900	11,010	900	8.5
Hughes.....	5,700	5,588	100	1.9	2.54	2.53	14,700	14,338	400	2.7
Jackson.....	11,600	10,543	1,000	9.7	2.61	2.77	31,200	30,356	800	2.8
Jefferson.....	3,200	3,174	-	0.9	2.48	2.53	8,100	8,183	-100	-0.7
Johnston.....	4,200	3,831	400	10.2	2.50	2.61	10,900	10,356	500	5.2
Kay.....	20,800	19,431	1,400	7.0	2.48	2.51	52,800	49,852	2,900	5.8
Kingfisher.....	5,900	5,161	700	13.5	2.73	2.72	16,100	14,187	1,900	13.6
Kiowa.....	5,200	5,042	100	2.4	2.41	2.48	12,700	12,711	-	-0.3
Latimer.....	3,700	3,398	300	7.8	2.69	2.71	10,400	9,840	600	5.6
Le Flore.....	16,100	14,484	1,600	11.0	2.68	2.75	44,000	40,698	3,300	8.0
Lincoln.....	11,000	9,649	1,400	14.4	2.70	2.73	30,100	26,601	3,500	13.2
Logan.....	10,700	9,414	1,300	14.2	2.72	2.70	31,100	26,881	4,200	15.6
Love.....	3,100	2,834	300	10.7	2.54	2.64	8,000	7,469	500	6.7
McClain.....	8,800	7,066	1,700	23.9	2.79	2.84	24,700	20,291	4,400	21.5
McCurry.....	12,800	12,366	400	3.2	2.82	2.89	36,500	36,151	300	0.9
McIntosh.....	7,000	5,935	1,100	17.9	2.45	2.57	17,500	15,562	2,000	12.5
Major.....	3,500	3,272	200	6.4	2.64	2.65	9,300	8,772	500	6.0
Marshall.....	4,600	4,158	400	10.8	2.46	2.49	11,500	10,550	1,000	9.3
Mayes.....	12,600	11,622	1,000	8.6	2.73	2.72	35,200	32,261	2,900	9.0
Murray.....	4,900	4,537	400	8.2	2.55	2.57	13,100	12,147	900	7.7
Muskogee.....	26,500	24,736	1,700	7.1	2.60	2.64	70,600	66,939	3,700	5.5
Noble.....	4,500	4,348	200	3.7	2.57	2.60	11,900	11,573	300	2.6
Nowata.....	4,300	4,327	-100	-1.6	2.59	2.61	11,200	11,486	-300	-2.5
Okfuskee.....	4,300	4,127	200	4.3	2.63	2.62	11,700	11,125	500	4.8
Oklahoma.....	253,200	220,580	32,600	14.8	2.45	2.54	631,200	568,933	62,300	11.0
Okmulgee.....	15,000	14,314	700	4.6	2.55	2.61	40,000	39,169	800	2.1
Osage.....	15,100	14,382	700	4.7	2.69	2.68	41,300	39,327	1,900	4.9
Ottawa.....	13,100	12,244	800	6.7	2.50	2.57	34,100	32,870	1,200	3.7
Pawnee.....	6,400	5,745	700	11.4	2.63	2.65	16,900	15,310	1,600	10.7
Payne.....	23,700	22,119	1,600	7.1	2.35	2.40	65,100	62,435	2,700	4.3
Pittsburg.....	16,200	15,036	1,200	7.9	2.53	2.57	43,500	40,524	3,000	7.4
Pontotoc.....	13,500	12,268	1,200	10.1	2.48	2.54	35,000	32,598	2,400	7.5
Pottawatomie.....	22,900	20,062	2,800	14.0	2.65	2.67	62,200	55,239	6,900	12.5
Pushmataha.....	4,700	4,355	300	7.6	2.58	2.67	12,300	11,773	500	4.1
Roger Mills.....	2,000	1,769	300	14.8	2.77	2.69	5,700	4,799	900	18.1
Rogers.....	18,900	15,650	3,300	21.0	2.88	2.94	55,200	46,436	8,700	18.8
Seminole.....	10,700	10,158	600	5.7	2.65	2.65	29,100	27,473	1,600	6.0
Sequoyah.....	12,100	10,473	1,600	15.1	2.81	2.90	34,300	30,749	3,500	11.4
Stephens.....	17,200	16,512	700	4.1	2.58	2.59	45,000	43,419	1,500	3.5
Texas.....	6,800	6,332	400	6.8	2.63	2.74	18,200	17,727	500	2.7
Tillman.....	4,500	4,681	-200	-3.5	2.49	2.58	11,600	12,398	-800	-6.5
Tulsa.....	205,000	181,620	23,400	12.9	2.45	2.54	512,000	470,593	41,400	8.8
Wagoner.....	16,900	13,768	3,100	22.7	2.95	3.02	50,100	41,801	8,300	19.9
Washington.....	18,500	18,750	-200	-1.3	2.47	2.53	46,400	48,113	-1,700	-3.6
Washita.....	5,300	5,138	200	2.9	2.63	2.64	14,200	13,798	400	2.6
Woods.....	4,300	4,425	-100	-2.0	2.31	2.33	10,600	10,923	-300	-3.0
Woodward.....	8,000	7,582	400	5.0	2.75	2.73	22,400	21,172	1,200	5.9
Oregon.....	1,044,000	991,593	53,000	5.3	2.52	2.60	2,686,000	2,633,105	53,000	2.0
Baker.....	6,400	6,169	200	3.6	2.45	2.58	15,900	16,134	-300	-1.8

## **REFERENCE 33**

## RECORD OF COMMUNICATION

TYPE: Phone Call

DATE: 8-3-90

TIME: 4:17 p.m.

TO: Paula Parker  
Bethany Chamber of Commerce  
Bethany, Oklahoma  
405-789-1256

FROM: Robert Taaffe  
FIT Chemist  
ICF Technology  
214-744-1641

SUBJECT: Population of Bethany, Oklahoma

### SUMMARY OF COMMUNICATION

Paula informed me that the population of Bethany, Oklahoma is approximately 23,000.

*Robert Taaffe*

## **REFERENCE 34**



## ICF TECHNOLOGY INCORPORATED

### MEMORANDUM

TO: David Wineman, Region VI, RPO  
THRU: K.H. Malone Jr., FITOM  
THRU: Tim Hall, ICF-AFITOM *TH for 9-1*  
FROM: Ravinder Joseph, and Heather Schijf, ICF-FIT <sup>HS</sup>  
DATE: October 24, 1988

SUBJECT: Resampling of municipal drinking water wells located near the Air Center Inc. site, in Oklahoma City, OK  
TDD # F-6-8808-36,  
CERCLIS # OKD980750319,  
PAN # FOK0270SCF.

The Air Center Inc. site is an inactive, abandoned aircraft renovation and paint stripping facility, that ceased operations in March of 1984. Waste generated from the stripping process was allowed to discharge into an unlined lagoon that drained into a drainage ditch, which in turn flowed into a residential pond. Also present on site are two underground storage tanks which were used to hold stripped paint sludge. At closure the unlined lagoon was filled in and the underground storage tanks pumped dry. Currently, the site is leased by Commander Aircraft, a subsidiary of the Gulfstream Aerospace Corporation. The buildings are utilized as paint hangers by Commander Aircraft. According to Wiley Post authorities, Commander Aircraft has been asked not to use any "corrosive" paints and to discharge wastewater only to the sanitary sewers of Oklahoma City. This is to be done only after obtaining a permit from the city.

Past sediment sampling by the Oklahoma Water Resources Board and by the Oklahoma Department of Health indicated elevated levels (above background) of cyanide, lead, chromium, phenol and zinc. Furthermore, sampling by the EPA-FIT in January of 1988 indicated the presence of phenol, and cyanide, in both on-site and off-site soil and water samples, and elevated levels of lead in the City of Bethany drinking water wells. The results indicated 176 ppb of lead in well #21 and 66 ppb of lead in well # 23.

On August 22, 1988, FIT team members, Ravinder Joseph (team leader), and Tom Rountree (site safety officer) resampled City of Bethany municipal drinking water wells # 21 and # 23. Well # 21 is located approximately 1.4 miles southwest of the site, and well # 23 is located approximately 3000 feet west of the site. A copy of



the USGS topographic map and sample location map are attached. The August, 1988 samples were analyzed for lead only. This resampling was due to the detection of lead in samples collected in January of 1988. Both samples were collected from taps or openings directly on the well head (see photographs # 4 and # 5). Table 1 indicates field measurements, collection times, and amount of lead detected in samples. Sample 4 is a trip blank using deionized water. Samples 1 and 4 were collected directly into the sample bottles. Samples 2 and 3 were collected in a glass beaker, and then poured into the sample bottles. All four samples were shipped to the EPA Houston lab on August 22, 1988, via Federal Express. Attached are copies of the chain of custody and receipt for samples.

Table 1

Sample #	Well #	Collection Time	Field Measurements			Lead in ppb
			pH	Cond.	Temp.	
1	21	1250 - 1255 hrs	7.57	465 umhos	26°C	7.6
2	23	1345 - 1350 hrs	6.3	250 umhos	25°C	< 5
3	24 (dup of 23)	1350 - 1355 hrs	6.3	250 umhos	25°C	< 5
4	Trip Blank	1220 - 1225 hrs	-	-	-	< 5

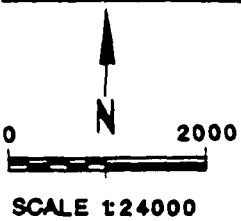
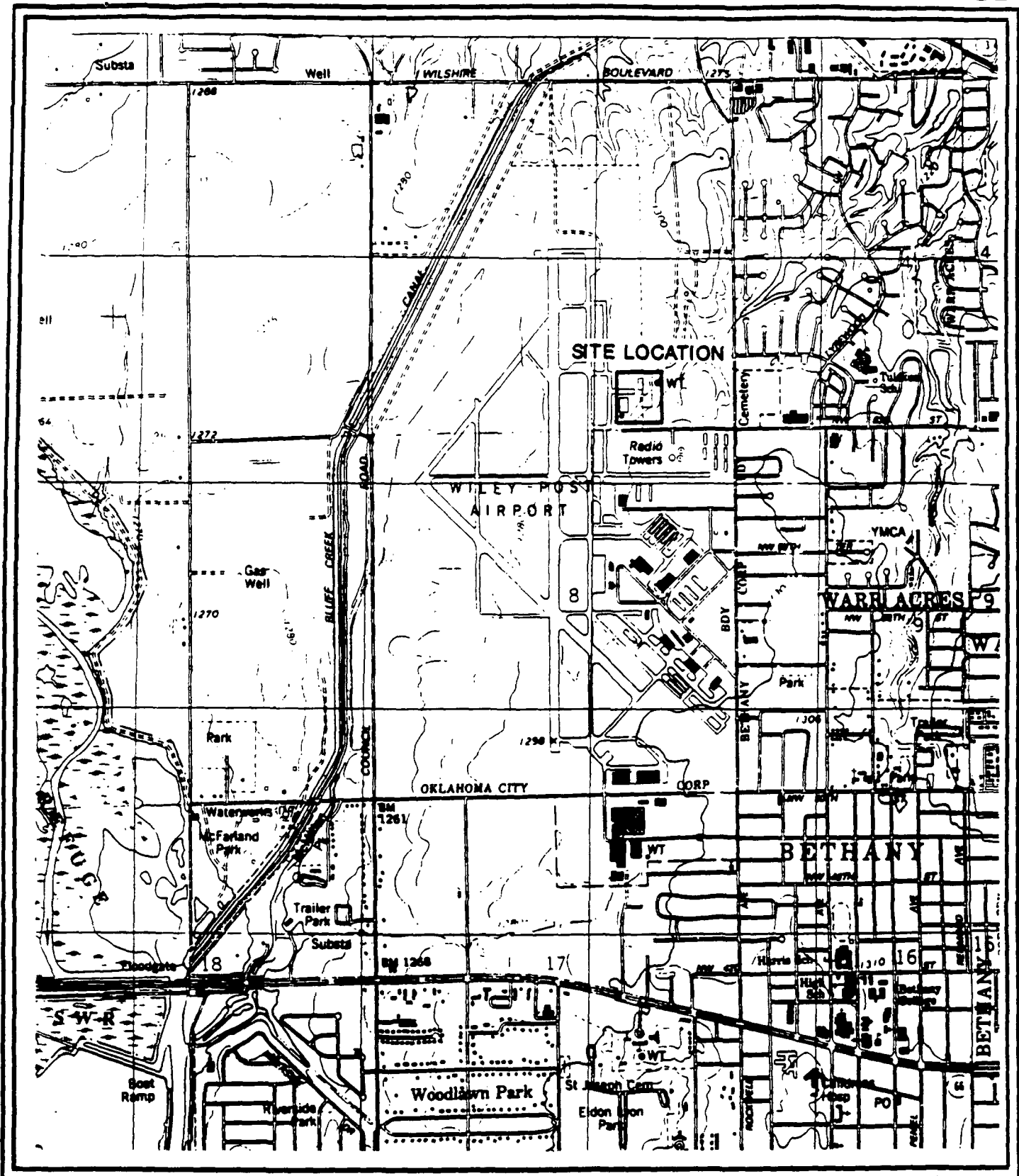
Analysis of the August 1988 samples indicates the presence of low levels of lead in well # 21. Lead was not detected in well # 23. The levels detected in well # 21 are well below the current Primary Drinking Water Standard of 50 ppb, and would still fall below the proposed standard of 20 ppb (see Attachment A for complete sample results). Although lead has been detected in on-site samples in the past, lead was not present in on-site samples collected by the FIT in January of 1988.

In response to TDD # F-6-8808-35, during the August 22, 1988 trip, FIT collected information in an attempt to determine additional potential contributors of lead contamination. Information was collected through drive bys of local industry and through the contacting of a state official. The attached map, titled Neighboring Industries, indicates their location and proximity to Air Center. FIT conducted off-site reconnaissance inspections of Gulfstream Aerospace Inc, the Wiley Post Airport, and Starlight Recoveries, all located nearby the Air Center site. FIT did not observe any noticeable problems from off-site which could contribute to surface migration of contaminants. Off-site photographs of the Wiley Post tank battery and Gulfstream are attached. Additional information regarding the operations of Starlight Recoveries was not obtained.

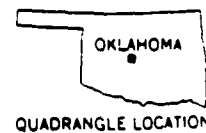
While observing from offsite, FIT saw what appeared to be a underground storage tank battery used for the storage of jet fuel. Information obtained from the Wiley Post authorities confirmed the presence of underground storage tanks. The Wiley Post Airport has a total of 17 underground storage tanks on-site for storing jet fuel. The total combined capacities of these tanks is estimated to be 228,000 gallons. The tanks are between 2-28 years old. It is not known whether any of these tanks have been leak tested. The potential exists for Wiley Post Airport to contribute to the lead contamination of groundwater as lead is a constituent of jet fuel.

FIT also contacted Tom Black with the Oklahoma Water Resources Board to obtain the following additional information on Gulfstream Aerospace Corporation (see Attachment B for file information obtained from Mr. Black). Gulfstream is a manufacturer of aircraft parts and is located at 5001 North Rockwell, Bethany, OK 73008. It is a generator of chromic acid, jet fuel and dried paint waste containing zinc chromate and solvents. Lead contaminated foundry sand was found dumped on-site during sampling by OSDH in May 1986. Spills of chromic acid and hydrofluoric acid were also reported in May 1986. Sampling by OSDH in May 1986, detected lead concentrations as high as 4850 ppm and chromium as high as 1281 ppm in soil samples. In addition, there are seven underground storage tanks at Gulfstream containing unleaded gas, diesel, and jet fuel. The tanks have a combined total capacity of 48,000 gallons. The tanks are between 15-26 years old. It is not known if any of these tanks have been leak tested, as it was only recently that the Oklahoma Corporation Commissions UST Department required test results to be submitted as part of the reporting requirement for underground storage tanks. The potential exists for Gulfstream to contribute to the lead and chromium contamination.

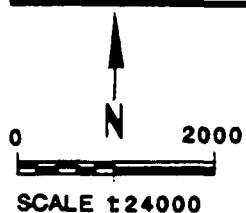
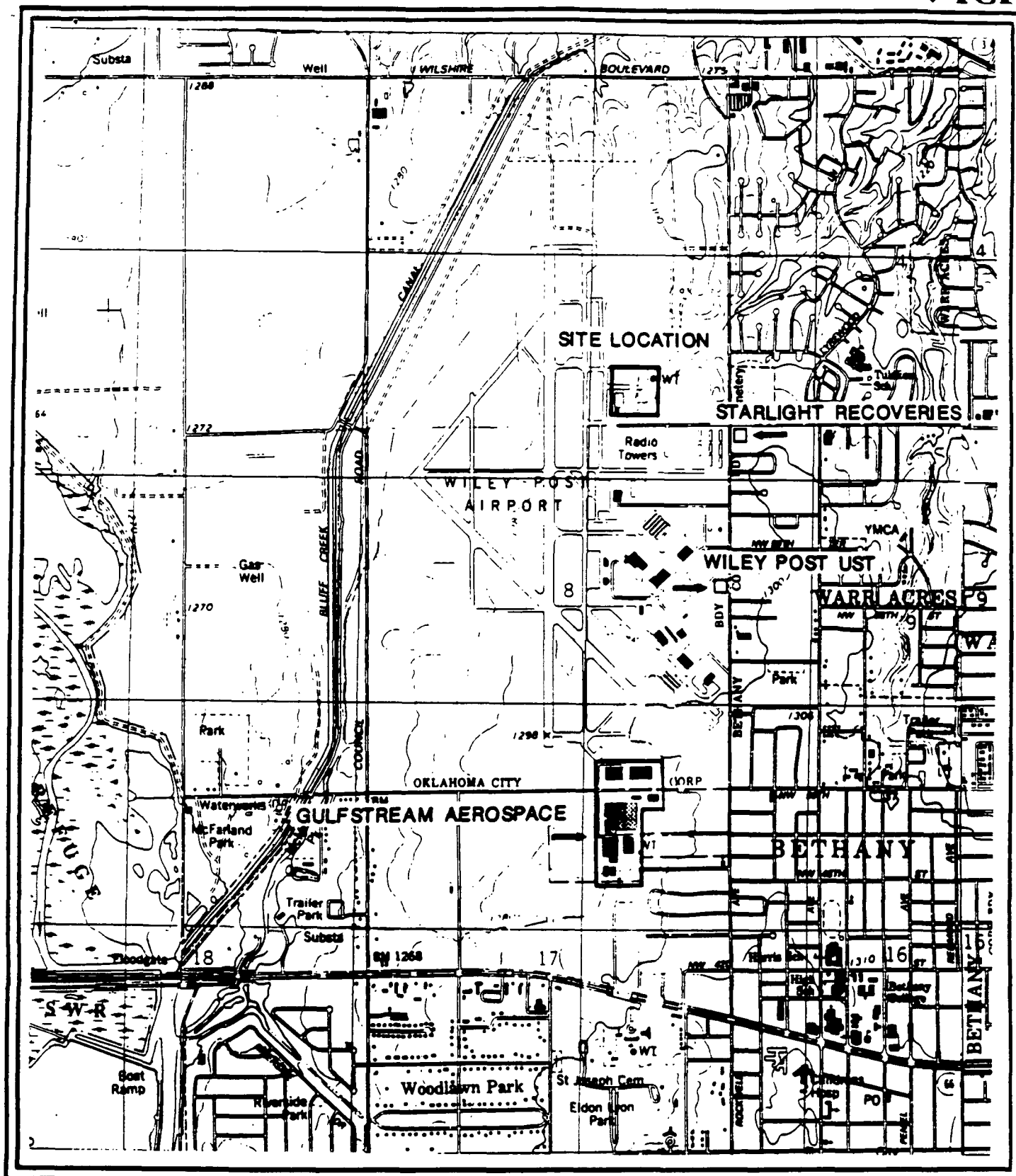
While it is unclear if Air Center is contributing to groundwater contamination, past sampling has indicated that Air Center has contributed to surface water contamination. It is recommended that the surface water route be further investigated. Furthermore, it is recommended that Gulfstream Aerospace, the Wiley Post Airport and Starlight Recoveries be investigated as possible sources of lead contamination to groundwater. Sampling of all 27 City of Bethany wells would assist in defining the plume and source of contamination accurately.



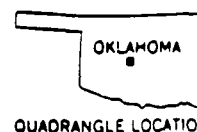
Site Location Map  
**AIR CENTER INC.**  
 OKLAHOMA CITY, OK  
 TDD NO. F-6-8808-36  
 CERCLIS NO. OKD980750319



QUADRANGLE LOCATION  
 BETHANY, OK BRITTON, OK



Neighboring Industries to Air Center, Inc.  
**AIR CENTER INC.**  
 OKLAHOMA CITY, OK  
 TDD NO. F-6-8808-36  
 CERCLIS NO. OKD980750319



QUADRANGLE LOCATION  
 BETHANY, OK BRITTON, OK

5

## SPECIAL ANALYSIS SUMMARY

SITE NAME AND NUMBER: AIR CENTER

CASE NUMBER: 8TFAFB29 PAGE 1 OF 1

CONCENTRATIONS IN PARTS PER BILLION

## TRAFFIC REPORT NUMBER AND STATION LOCATION.

[illegible]

R - DATA IS UNUSABLE DUE TO QA/QC OUT OF CONTROL LIMITS.

J - REPORTED CONCENTRATIONS OR DETECTION LIMITS ARE ESTIMATES DUE TO QA/QC OUT OF CONTROL.

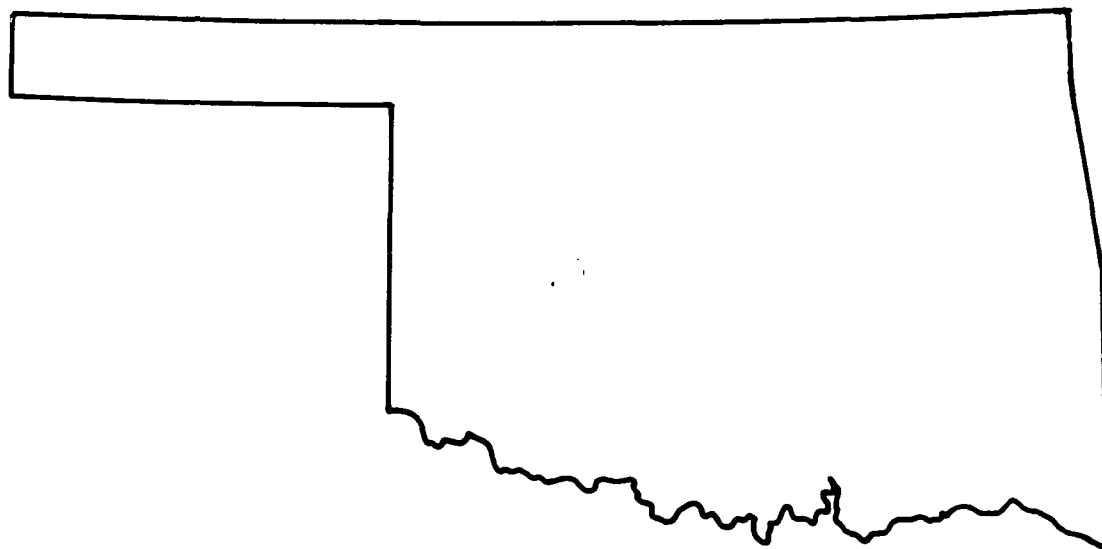
B - CONCENTRATION IN SAMPLE ATTRIBUTABLE TO BLANK CONTAMINATION.

U - NOT DETECTED; VALUE REPORTED IS THE DETECTION LIMIT.

## **REFERENCE 35**



# Water Resources Data Oklahoma Water Year 1990



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT OK-90-1  
Prepared in cooperation with the State of Oklahoma  
and with other agencies

## ARKANSAS RIVER BASIN

07241000 NORTH CANADIAN RIVER BELOW LAKE OVERHOLSER, NEAR OKLAHOMA CITY, OK

LOCATION.-- Lat 35°28'43", long 97°39'47", in NE 1/4 of NW 1/4 of sec.31, T. 12N., R. 4W, Oklahoma County, Hydrologic Unit 11100301, on left downstream side of bridge on NW 10th Street, 0.5 mi downstream from Lake Overholser, 2.4 mi upstream from Mustang Creek, 9.1 mi southwest of State Capitol of Oklahoma, and at river mile 281.0.

DRAINAGE AREA.-- 13,222 mi<sup>2</sup>, of which 4,899 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.-- October 1952 to September 1988, October 1969 to September 1972, October 1973 to September 1987, October 1988 to current year.

GAGE.-- Water-stage recorder. Datum of gage is 1,194.86 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1981, at datum 10.00 ft higher. Prior to March 24, 1971, gage located at current site. March 25, 1971, to Sept. 30, 1987, gage located 200 ft upstream.

REMARKS.-- Records fair. Flow regulated by Canton Lake (station 07238500) and Lake Overholser (station 07240500). Diversions upstream from station into Lake Overholser and Lake Hefner Canal (station 07240000). Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Geological Survey's satellite telemeter at station.

AVERAGE DISCHARGE.-- 35 years (water years 1953-88, 1970-72, 1974-87, 1989), 141 ft<sup>3</sup>/s, 102,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge, 18,700 ft<sup>3</sup>/s, May 28, 1987, gage height, 29.85 ft, from high-water mark; no flow at times in 1952-57.

EXTREMES OUTSIDE PERIOD OF RECORD.-- A stage of 40.9 ft, present datum, was reached in October 1923 from information provided by Oklahoma State Highway Department.

EXTREMES FOR CURRENT YEAR.-- Maximum discharge, 9,570 ft<sup>3</sup>/s, Mar. 12, gage height, 22.80 ft; minimum daily discharge, 4.2 ft<sup>3</sup>/s, Sept. 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	246	269	161	151	319	1610	482	316	660	e70	33	35
2	300	72	172	171	313	1380	426	1800	573	e84	33	35
3	211	150	161	176	339	744	325	5180	487	e60	35	35
4	159	219	182	183	306	631	310	5900	536	e68	73	e22
5	182	222	181	174	300	690	355	2300	580	e52	69	e11
6	400	218	e170	177	311	561	336	1310	580	49	70	e10
7	294	219	e182	178	307	859	327	1000	583	45	78	e9.8
8	280	222	e180	178	308	845	328	1130	371	45	69	e10
9	200	232	e170	204	280	720	349	1160	248	44	63	e10
10	197	186	e160	189	238	608	443	689	261	43	55	e12
11	318	96	e175	269	238	5700	354	755	272	38	49	e27
12	440	98	150	316	239	7780	350	777	270	36	48	39
13	439	98	165	231	241	4880	364	746	204	33	49	40
14	388	97	188	273	250	3400	291	693	171	30	47	38
15	223	194	170	414	240	4310	201	660	169	30	47	37
16	344	119	155	502	238	1980	294	693	167	29	42	37
17	283	94	155	415	238	1400	498	658	165	28	35	37
18	139	93	141	436	239	966	1180	609	164	28	38	38
19	85	95	134	440	237	758	410	607	160	27	36	49
20	165	121	134	451	237	843	51	1010	154	28	36	110
21	178	138	145	438	242	819	33	521	143	28	36	273
22	174	209	155	344	327	722	248	370	129	32	35	e18
23	105	138	152	270	691	426	604	256	128	29	35	e15
24	53	138	147	348	562	401	633	328	128	27	38	e10
25	54	143	143	249	115	484	462	378	127	22	35	e7.0
26	117	139	144	288	105	480	704	528	125	21	38	e8.0
27	175	209	150	328	484	430	208	1490	123	20	38	e5.5
28	189	202	144	302	1690	432	33	763	104	21	38	4.2
29	195	159	135	304	---	439	408	498	83	21	35	e4.5
30	320	161	137	316	---	622	451	681	e74	20	38	e4.4
31	380	---	139	307	---	624	---	656	---	28	36	---
TOTAL	7217	4750	4815	9028	9594	48110	11444	34328	7935	1102	1398	987.2
MEAN	233	150	155	291	343	1487	381	1107	264	35.5	45.0	32.9
MAX	440	209	182	502	1690	7780	1160	5900	660	70	78	273
MIN	53	72	134	151	105	401	33	256	74	20	33	4.2
AC-FT	14310	9420	9550	17910	19030	91480	22700	68090	15740	2190	2770	1980

CAL YR 1989 TOTAL 159474.4 MEAN 437 MAX 6970 MIN 2.8 AC-FT 316300  
WTR YR 1990 TOTAL 138706.2 MEAN 380 MAX 7780 MIN 4.2 AC-FT 275100

e Estimated



## **REFERENCE 36**

Enter the next ring distance

GEMS>

Enter program execution mode: B (batch) or I (interactive)

GEMS> i

gulfstream

LATITUDE 35:31:40 LONGITUDE 97:38:28 1980 POPULATION

							SECTOR
KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	TOTALS
S 1	0	0	0	3882	4648	5853	14383
S 2	0	0	1531	8065	6028	4832	20456
S 3	0	0	2151	6017	9358	16244	33770
S 4	0	0	500	5950	15159	10777	32386
S 5	0	0	0	1581	1230	2214	5025
S 6	0	0	30	0	3086	0	3116
RING	0	0	4212	25495	39509	39920	109136
TOTALS							

press RETURN to continue

Esc for Attention, Home to Switch

||

Capture Off

||

On: 00:04:15

## **REFERENCE 37**


## RECORD OF COMMUNICATION

Reference 37

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**TYPE:** Phone Call      **DATE:** 3-24-92      **TIME:** 9:05 a.m.

**TO:** Bob Fabian  
Oklahoma Water Resources Board  
(405) 231-2555

**FROM:** Kevin Jaynes, Site Manager   
ICF Technology, Inc.  
Dallas, Texas 75201  
(214) 979-3947

**SUBJECT:** Wellhead Protection Plan for Bethany, Oklahoma

### SUMMARY OF COMMUNICATION:

Mr. Fabian indicated that the community of Bethany has not requested or delineated a wellhead protection plan.

Only six community delineations are completed.

The state of Oklahoma and the Department of Health do have a minimum 300 feet set back requirement for wells.

The Department of Pollution Control is the lead agency for this program.

Call Sylvia Ritzkie at Department of Pollution Control at (405) 271-4468.


## **REFERENCE 38**

## RECORD OF COMMUNICATION

Reference 38

**TYPE:** Phone Call      **DATE:** 3-24-92      **TIME:** 11:30 a.m.

**TO:** Bob Martin, Biologist  
Oklahoma Fish and Wildlife Dept.  
(405) 755-4014

**FROM:** Kevin Jaynes, Site Manager   
ICF Technology, Inc.  
Dallas, Texas 75201  
(214) 979-3947

**SUBJECT:** Creel Survey for Lake Overholser

### SUMMARY OF COMMUNICATION:

Mr. Bob Martin returned my call. A Creel Survey for Lake Overholser done in 1985-1986 revealed the following:

<u>Species</u>	<u>Kilograms</u>	=	<u>Pounds</u>
Large Mouth Bass	600		1,323
Crappie	1,788		3,943
White Bass	24,416		53,837
Striped Bass	25,416		56,042
Walleye	647		1,427
Channel Catfish	24,131		53,209
Flathead Catfish	942		2,077

No rough fish (i.e., Carp, Buffalo, Gar) were recorded. However, an estimate was 3,346 kilograms or 7,378 pounds. Total poundage of fish caught fro Lake Overholser for 1985-1986:

Sport fish	= 171,858 lbs.
Including Rough fish (+7,378)	= 179,236 lbs.

## **REFERENCE 39**

REGION 6  
 CERCLIS VERSION 2.0  
 MASTER LISTING  
 OK

EPA ID	SITE NAME	ADDRESS	CITY	COUNTY	ZIP CODE	NPL INDICATOR
OKD980698104	CADDU COUNTY LANDFI*	SE4 SE4 SEC34 T9N R*	FORT COBB	CADDU	73038	N
OKD980698112	CADDU COUNTY LANDFI*	SW4 NE4 SEC14 T9N R*	FORT COBB	CADDU	73038	N
OKD980698127	CADDU COUNTY LANDFI*	NE4 NE4 SEC22 T9N R*	FORT COBB	CADDU	73038	N
OKD000763797	PUBLIC SERVICE CO S*	2 MI N OF WASHITA U*	WASHITA	CADDU	73094	N
OKD980507966	GRANDLEY FLYING SER*	RT. 1 BOX 205A	EL RENO	CANADIAN	73036	N
OKD990698722	GREAT PLAINS LIVEST*	SW 1/4 SEC 7 T13N R*	EL RENO	CANADIAN	73036	N
OKD987071008	EL RENO GAS & ELECT*	UNKNOWN	EL RENO	CANADIAN	73036	N
OKD987073475	EL RENO ROUNDHOUSE *	US-81 NORTH OF CITY	EL RENO	CANADIAN	73036	N
OKD981517766	HUFNAGEL PROPERTY	JN HWY 4 & E OF 1.2*	PIEDMONT	CANADIAN	73078	N
OKD982305187	SYMES LANDFILL	1.5 MI NW AT LAKE O*	YUKON	CANADIAN	73099	N
OKD987069874	HOSTER #1 DRUMS	N SIDE OF NW 63RD S*	YUKON	CANADIAN	73099	N
OKD987082971	UNION PACIFIC RAIL *	US HIGHWAY 81 NORTH	EL RENO	CANADIAN	75081	N
OKD980698264	RATLIFF CITY OF LAN*	2 MI W 1.6 MI N RAT*	RATLIFF CITY	CARTER	73081	N
OKD980698371	TATUMS CITY OF LAND*	1 MI W OF TATUMS	TATUMS	CARTER	73087	N
OKD001998517	STROMBERG CARLSON C*	12 MI N OF ARDMORE	ARDMORE	CARTER	73401	N
OKD007201155	GEORGIA-PACIFIC COR*	2300 'P' ST NE - AR*	ARDMORE	CARTER	73401	N
OKD052879632	JACON TRANSPORT CO *	420 HWY 142E SW/4	ARDMORE	CARTER	73401	N
OKD057785972	TOTAL PETROLEUM COR*	P.O. BOX 188	ARDMORE	CARTER	73401	N
OKD980510697	BAKERS TRI-CITY LAN*	HWY 76 2 MI S OF AR*	ARDMORE	CARTER	73401	N
OKD980515308	OLD ARDMORE DUMP	HWY 142 BYPASS - EA*	ARDMORE	CARTER	73401	N
OKD980698187	ARDMORE AIR PARK DU*	S/2 SEC 17 T3S R3E	ARDMORE	CARTER	73401	N
OKD980750426	LAKE MURRAY STATE P*	3 MI S OF ARDMORE	ARDMORE	CARTER	73401	N
OKD021925995	HELICOPTER SPRAYING*	1333 S. LAKE MURRY *	ARDMORE	CARTER	73402	N
OKD032950529	GRAZY WELDING & MAC*	HWY 76 1 MI N OF TU*	HEALDTON	CARTER	73438	N
OKD980511011	HEALDTON CITY OF DU*	NORTH 4TH STREET	HEALDTON	CARTER	73438	N
OKD980511396	WILSON DUMP	NW/4 SW/4 SE/4 SEC *	WILSON	CARTER	73463	N
OKD980750855	BOLLARD'S OILFIELD *	ROUTE 2	WILSON	CARTER	73463	N
OKD981523381	TRI-CITY LANDFILL	STAR ROUTE BOX 17	WILSON	CARTER	73463	N
OKD981523863	OPEN DUMP-TAHLEQUAH	DEAD OF N CEDAR AVE	TAHLEQUAH	CHEROKEE	74464	N
OKD987074259	SEQUOYAH HIGHH SCHU*	1 MI. SO. OF HWY 62	TAHLEQUAH	CHEROKEE	74464	N
OKD030198455	HUGO WASTE DISPOSAL*	S. OF HUGO & W OF 8*	HUGO	CHOCTAW	74743	N
OKD082708371	HUGO RAIL CAR INC	1806 W GARRETT, RT *	HUGO	CHOCTAW	74743	N
OKD990750151	CENTRAL FOREST PROJ*	YERBY & COMPRESS, B*	HUGO	CHOCTAW	74743	N
OKD980511783	HACKEY PACKING INC	NE/4 SEC 9 T3 R5	BOISE CITY	CIMARRON	73933	N
OKD981157751	COMPTON'S SPRAYING *	809 N OKLAHOMA AVE	BOISE CITY	CIMARRON	73933	N
OKD981158325	MILLER AERO SERVICE*	310 SW 4TH	BOISE CITY	CIMARRON	73933	N
OKD980749709	BLACK MESA STATE PA*	SE END BLACK MESA P*	KENTON	CIMARRON	73946	N
OKD981144322	AG ENTERPRISES	1.5MI E HWY 77 1103*	NOBLE	CLEVELAND	73068	N
OKD007188097	ACME FENCE & IRON S*	3505 I-35 N	NORPAN	CLEVELAND	73070	N
OKD093506262	HILLCUMB SPRAYING SE*	1.2 MI S OF PLATO R*	DUNCAN	COMANCHE	73501	N
OKD980876772	MEDICINE CREEK ARRA*	1/2 MI SOUTH OF CITY	MEERS	COMANCHE	73501	N
OKD049404544	YARMUK SCRAP PROCES*	997 S RAILROAD ST	LAWTON	COMANCHE	73502	N
OK4213720846	US ARMY FIELD ARTIL*	ATZR-FEED BUILDING *	FORT SILL	COMANCHE	73503	N
OKD981144363	WOLF CREEK LANDFILL	3103 SW WOLF ST	LAWTON	COMANCHE	73505	N
OKD981517634	G & C HELICOPTER	818 H STREET	ELGIN	COMANCHE	73538	N
OKD980698136	HUGHES COUNTY LANOF*	N/2 SW/4 SEC 16 T6N*	CLAVIN	COMANCHE	73540	N



REGION 6  
 CERCLIS VERSION 2.0  
 MASTER LISTING  
 OK

EPA ID	SITE NAME	ADDRESS	CITY	COUNTY	ZIP CODE	NPL INDICATOR
OKD980511042	INDUSTRIAL WASTE DI*	CW 73 004	BLANCHARD	MCCLAIN	73010	N
OKD980750301	ABANDONED STRIP MINE	N PORTLAND & E KELLY	NEWCASTLE	MCCLAIN	73065	N
OKD000400093	HARDAGE/CRINER	3/4 MI W OF TOWN ON*	CRINER	MCCLAIN	73080	F
OKD981602394	PERFECTION HY-TEST	S HWY 77 N WALNUT C*	PURCELL	MCCLAIN	73080	N
OKD980696702	HUMPHREYS SITE	SW/4 SEC 3 T6N R4W	DIBBLE	MCCLAIN	73093	N
OKD987085511	ABANDONED WOOD PRES*	SEC. 17 T025 R22E 1M	CLEBIT	MCCURTAIN	74732	N
OKD987068731	WOODLAND PRODUCTS	U. S. HWY 70 WEST	VALLIANT	MCCURTAIN	74764	N
OKD981157977	EASTERN OKLAHOMA TE*	517 W. LAFAYETTE	CHECUTAH	MCINTOSH	74426	N
OKD980750921	SOONER ROCK AND SAND	3 MILES SW OF DAVIS	DAVIS	MURRAY	73030	N
OKD980864383	AKBUCKLE REGIONAL D*	15 MI E OF IH35 & H*	DAVIS	MURRAY	73030	N
OKD000395186	GT METALS	ROUTE 2	MUSKOGEE	MUSKOGEE	74401	N
OKD007044142	BLITHEVILLE CANNING*	1900 NORTH STREET	MUSKOGEE	MUSKOGEE	74401	N
OKD007221831	FANSTEEL METALS	10 TANTALUM PLACE	MUSKOGEE	MUSKOGEE	74401	N
OKD007222805	BRUCKWAY GLASS COMP*	US HWY 62	MUSKOGEE	MUSKOGEE	74401	N
OKD007224280	ACME ENGINEERING & *	1820 NORTH YORK	MUSKOGEE	MUSKOGEE	74401	N
OKD007227192	CORNING GLASS WKS. *	1500 SUMMIT	MUSKOGEE	MUSKOGEE	74401	N
OKD032994345	MADEWELL METAL DISP*	301 E SHAWNEE BY. PA*	MUSKOGEE	MUSKOGEE	74401	N
OKD032997496	YAFFEE IRON & METAL*	H & LEXINGTON STREE*	MUSKOGEE	MUSKOGEE	74401	N
OKD072414741	FORT HOWARD PAPER C*	5600 E. CHANDLER RD	MUSKOGEE	MUSKOGEE	74401	N
OKD980696355	SMOKES INDUSTRIES	5531-A SOUTH LEWIS	MUSKOGEE	MUSKOGEE	74401	N
OKD980696728	MUSKOGEE ENVIRONMEN*	SW/4 SEC 27 T13N R1*	MUSKOGEE	MUSKOGEE	74401	N
OKD980750400	JW HURLEY BATTERY S*	309 MADISON AVENUE	MUSKOGEE	MUSKOGEE	74401	N
OKD980795678	SINCLAIR OIL & REFI*	24TH ST SW CRN FRIS*	MUSKOGEE	MUSKOGEE	74401	N
OKD987067931	HUGGINS RESIDENCE	2202 JEFFERSON	MUSKOGEE	MUSKOGEE	74403	N
OKD980696710	MUSKOGEE ENVIRONMEN*	SE/4 NE/4 SW/4 SEC2*	FORT GIBSON	MUSKOGEE	74434	N
OKD085956191	WELLS COAL CO LAGOON	EAST OF HASKELL	HASKELL	MUSKOGEE	74436	N
OKD980696736	MUSKOGEE ENVIRONMEN*	SW/4 SEC30 NW/4SEC3*	PORUM MINES	MUSKOGEE	74455	N
OKD980696195	IMPERIAL COAL CO - *	PO BOX 8*	WARNER	MUSKOGEE	74469	N
OKD033158106	HURNE SPRAY CO INC	.5 MI N OF I-40,WEB*	WEBBER FALLS	MUSKOGEE	74470	N
OKD007240088	CHARLES MACHINE WOR*	1959 W FIR AVE	PERRY	NOBLE	73077	N
OKD980511141	NOBLE COUNTY DUMP	4 1/2 MI N OF DITCH *	PERRY	NOBLE	73077	N
OKD980424923	BOND'S CUSTOM BUTCH*	PO BOX 112	DELAWARE	NOWATA	74027	N
OKD980511158	NOWATA DUMP #2 (ROA*	N END OF OAK STREET	NOWATA	NOWATA	74048	N
OKD980870273	NOWATA COUNTY #1	2 MI W OF CHILDERS *	NOWATA	NOWATA	74048	N
OKD980879688	NOWATA CITY OF SANI*	1 MI S OF CITY ON H*	NOWATA	NOWATA	74048	N
OKD981054109	UKEMAH DRUM SITE	1 1/8 MI E & 1/2 S *	UKEMAH	OKFUSKEE	74859	N
OKD020735189	BETHANY CITY OF LAN*	NW 39TH	BETHANY	OKLAHOMA	73008	N
OKD079979936	CENTRAL OKLAHOMA SA*	3610 N WILBURN	BETHANY	OKLAHOMA	73008	N
OKD981518327	GULF STREAM AEROSPA*	5001 NORTH ROCKWELL	BETHANY	OKLAHOMA	73008	N
OKD074276965	KELLEY-WILLIAMS FUR*	14801 BROADWAY EXTE*	EDMOND	OKLAHOMA	73034	N
OKD104850524	TURNER BROTHERS' PT*	4725 N. BOULEVARD	EDMOND	OKLAHOMA	73034	N
OKD980511091	MARATHON RANKIN #2 *	SW4 SEC31 T14N R3W	EDMOND	OKLAHOMA	73034	N
OKD032963533	MADEWELL & MADEWELL	CHOCTAW RD & NE 93RD	JONES	OKLAHOMA	73049	N
OKD980864482	QUALITY SAND AND GR*	MOSLEY ROAD	OKLAHOMA CITY	OKLAHOMA	73049	N
OKD980515316	OLD OKC DUMP FOSTER*	SW1/4 SEC 32 R3W T12N	OKLAHOMA CITY	OKLAHOMA	73101	N
OKD980696447	WALNUT GROVE SALT W*	SEC3 T12N R3W	OKLAHOMA CITY	OKLAHOMA	73101	N

REGION 6  
 CERCLIS VERSION 2.0  
 MASTER LISTING  
 OK

EPA ID	SITE NAME	ADDRESS	CITY	COUNTY	ZIP CODE	NPL INDICATOR
OKD981146004	STRING OF PEARLS PA*	BY K.R. TRACKS AND *	OKLAHOMA CITY	OKLAHOMA	73101	N
OKD982311433	EASTERN AVENUE SITE	1600* N OF RENO AVE*	OKLAHOMA CITY	OKLAHOMA	73101	N
OKD981917347	OKLAHOMA CITY PROPE*	500 S.E. 9TH ST	OKLAHOMA CITY	OKLAHOMA	73102	N
OKT410010268	KERR-MCGEE CORP TEC*	123 NW ROBERT S KER*	OKLAHOMA CITY	OKLAHOMA	73102	N
OKD987070521	C. M. AULT	326 EAST SHERIDAN	OKLAHOMA CITY	OKLAHOMA	73104	N
OKD980511174	OKLAHOMA CITY DISPO*	36TH ST	OKLAHOMA CITY	OKLAHOMA	73105	N
OKD980515290	OKLAHOMA CITY DUMP	NE 4TH ST W OF RAIL*	OKLAHOMA CITY	OKLAHOMA	73105	N
OKD987067634	CLAYTON PLATING CUM*	1336 WEST MAIN STRE*	OKLAHOMA CITY	OKLAHOMA	73106	N
OKD980696652	ROSE EQUIPMENT CO	1829 LINWOOD	OKLAHOMA CITY	OKLAHOMA	73106	N
OKD007208747	D & K PLATING	4600 NW 7TH; .8 MI *	OKLAHOMA CITY	OKLAHOMA	73106	N
OKD037986957	MAGNETIC PERIPHERAL*	76 S MERIDIAN AVE	OKLAHOMA CITY	OKLAHOMA	73107	N
OKD007191381	UNION CARBIDE CORPU*	1700 S AGNEW AVE	OKLAHOMA CITY	OKLAHOMA	73108	N
OKD007190556	STAR MANUFACTURING *	8600 S I-35	OKLAHOMA CITY	OKLAHOMA	73109	N
OKD980511125	MIDWEST MACHINE	6804 MELROSE LANE	OKLAHOMA CITY	OKLAHOMA	73109	N
OKD980864490	OKLAHOMA CITY DISPO*	245 SW 15TH STREET	OKLAHOMA CITY	OKLAHOMA	73109	N
OKD980511422	OKLAHOMA CITY LANDF*	23RD & SOONER RD	OKLAHOMA CITY	OKLAHOMA	73110	N
OKD980879357	FAZIER PROPERTY	ABOUT 3200 NE 5TH S*	OKLAHOMA CITY	OKLAHOMA	73110	N
OKD049397685	ASSOCIATED MILK PRO*	1700 N SOONER	OKLAHOMA CITY	OKLAHOMA	73111	N
OKD980621967	TENTH STREET DUMP/J*	3200 NE 10TH ST	OKLAHOMA CITY	OKLAHOMA	73111	F
OKD046658593	BRNOIX HEAVY VEHICLE	3737 NORTH PORTLAND*	OKLAHOMA CITY	OKLAHOMA	73112	N
OKD980696645	ACME TRUCK CO	SEC 15 T13N R3W	OKLAHOMA CITY	OKLAHOMA	73114	N
OKD980696819	CIMMARON AIRPORT PO*	SEC 27 T12N R6W	OKLAHOMA CITY	OKLAHOMA	73114	N
OKD007193220	BROWN MANUFACTURING*	13431 BROADWAY EXT.	OKLAHOMA CITY	OKLAHOMA	73114	N
OKD980510655	SOUTHEAST SANITARY *	SE 74TH & BRYANT	OKLAHOMA CITY	OKLAHOMA	73115	N
OKD049400302	FAIR ELECTRONICS SE*	1520 W WILSHIRE BLVD	OKLAHOMA CITY	OKLAHOMA	73116	N
OKD007194517	OK HEARN MACHINE MO*	3201 E RENO	OKLAHOMA CITY	OKLAHOMA	73117	N
OKD980511203	POND (E RENO AVE SI*	1001 E RENO AVE	OKLAHOMA CITY	OKLAHOMA	73117	N
OKD980620366	MOSLEY ROAD SANITAR*	MOSELEY RD BTWN NE *	OKLAHOMA CITY	OKLAHOMA	73117	F
OKD980696471	FOURTH STREET ABAND*	2200 BLOCK NE 4TH	OKLAHOMA CITY	OKLAHOMA	73117	F
OKD980696603	CANADIAN TRUCK REPA*	3307 NE 10TH ST	OKLAHOMA CITY	OKLAHOMA	73117	N
OKD980696458	OKLAHOMA CITY DUMP*	NE 10 AND GRAND BLVD	OKLAHOMA CITY	OKLAHOMA	73117	N
OKD980865001	1 TH & BRYAN STREET*	NW CORNER OF 10TH & *	OKLAHOMA CITY	OKLAHOMA	73117	N
OKD007186963	MACCLANBURG-DUNCAN *	4041 N SANTA FE	OKLAHOMA CITY	OKLAHOMA	73118	N
OKD980425045	F & K PLATING	4420 N SEWELL	OKLAHOMA CITY	OKLAHOMA	73118	N
OKD0080829523	THOMPSON HAYWARD CH*	3909 S MERIDIAN	OKLAHOMA CITY	OKLAHOMA	73119	N
OKD007206923	WHEATLAND DRUM SITE	6800 S COUNCIL ROAD	WHEATLAND	OKLAHOMA	73119	N
OKD042146524	ASHLAND CHEMICAL CO*	4300 SW 36TH ST	OKLAHOMA CITY	OKLAHOMA	73119	N
OKD089092175	CHEMICAL PRODUCTS D*	5001 S MCARTHUR	OKLAHOMA CITY	OKLAHOMA	73119	N
OKD980696793	MID-WEST WRECKING C*	NE 50TH AND BRYANT	OKLAHOMA CITY	OKLAHOMA	73121	N
OKD980696801	DUMP - NORTHEAST 58*	NE 58TH & BRYANT	OKLAHOMA CITY	OKLAHOMA	73121	N
OKD980864516	OKLAHOMA CITY DUMP*	5500 NE 23RD	OKLAHOMA CITY	OKLAHOMA	73121	N
OKD002886675	BILL HODGES TRUCK CO	4050 W I-40	OKLAHOMA CITY	OKLAHOMA	73125	N
OKD087001508	ELTRA CORPORATION	800 S W 3RD (4TH & *	OKLAHOMA CITY	OKLAHOMA	73125	N
OKD0690540300	FRA MIKE MURKUNY A*	P O BOX 25082;6500 *	OKLAHOMA CITY	OKLAHOMA	73125	N
OKD002786473	BUCKET SHOP	5555 NW 5TH	OKLAHOMA CITY	OKLAHOMA	73127	N
OKD049987605	CUNCHO CONSTRUCTION*	2810 N MCARTHUR BLVD	OKLAHOMA CITY	OKLAHOMA	73127	N

REGION 6  
 CERCLIS VERSION 2.0  
 MASTER LISTING  
 OK

EPA ID	SITE NAME	ADDRESS	CITY	COUNTY	ZIP CODE	NPL INDICATOR
OKD115366510	SUPERIOR PLATING	100N ROCKWELL #90	OKLAHOMA CITY	OKLAHOMA	73127	N
OKD981515919	WEST RENO RD AREA	8700 BLK OF WEST RE*	OKLAHOMA CITY	OKLAHOMA	73127	N
OKD987068350	NICHILSON PLATING	4625 NW 10TH	OKLAHOMA CITY	OKLAHOMA	73127	N
OKD987084670	AUXIER-SCOTT SUPPLY*	8301 NW. 2ND	OKLAHOMA CITY	OKLAHOMA	73127	N
OKD987066657	VEMCO PLATING	8500 SW 8TH	OKLAHOMA CITY	OKLAHOMA	73128	N
OKD000803205	DAYTON TIRE & RUBBER*	2500 S COUNCIL RD	OKLAHOMA CITY	OKLAHOMA	73128	N
OKD007464753	INTERNATIONAL ENVIR*	5000 SW7 SECT T11 N*	OKLAHOMA CITY	OKLAHOMA	73128	N
OKD065429946	FILL SAND LTD LANDF*	8701 WEST RENO	OKLAHOMA CITY	OKLAHOMA	73128	N
OKD094775251	BILL COOPER FRAC TA*	8236 W I-40	OKLAHOMA CITY	OKLAHOMA	73128	N
OKD007209539	BALUN CORPORATION -*	3245 S HATTIE	OKLAHOMA CITY	OKLAHOMA	73129	N
OKD009314105	ANCO SERVICE CORP	737 SE 30TH	OKLAHOMA CITY	OKLAHOMA	73129	N
OKD033048372	SEA OIL FIELD ENGIN*	4100 SOUTH EASTERN	OKLAHOMA CITY	OKLAHOMA	73129	N
OKD060778065	PHILLIPS PETROLEUM *	910 S FAIRMONT	OKLAHOMA CITY	OKLAHOMA	73129	N
OKD077327211	BAKER OIL TREATING	2700 SOUTH HIGH	OKLAHOMA CITY	OKLAHOMA	73129	N
OKD980336341	ALPHA DRUM CO	424 SE 3RD	OKLAHOMA CITY	OKLAHOMA	73129	N
OKD980696660	TIME-DC TRUCKING CO*	1400 SE SKYLINE	OKLAHOMA CITY	OKLAHOMA	73129	N
OKD983749444	OKLAHOMA CITY ABAND*	SEC 22 R3W T11N	OKLAHOMA CITY	OKLAHOMA	73129	N
OKD980750335	TRANSFER STATION	4100 S MISSOURI	OKLAHOMA CITY	OKLAHOMA	73129	N
OKD000763664	PHILLIPS PETROLEUM *	306 N JACKSON	OKLAHOMA CITY	OKLAHOMA	73130	N
OKD980696684	JACK DENNIS PESTICI*	9545 E RENO AVE	MIDWEST CITY	OKLAHOMA	73130	N
OKD980696678	RED ROCK PETROLEUM *	8400 NE EXPRESSWAY	OKLAHOMA CITY	OKLAHOMA	73131	N
OKD987070059	WILEY POST AIRPORT	5700 NORTH ROCKWELL	BETHANY	OKLAHOMA	73131	N
OKD980750319	AIR CENTER INC - WI*	HANGER 8, WILEY POS*	OKLAHOMA CITY	OKLAHOMA	73132	N
OKD006557250	WALL COLUMBUS CORP	4700 SE 59TH STREET	OKLAHOMA CITY	OKLAHOMA	73135	N
OKD059067553	CARLON-AN INDIAN HE*	6500 INTERPACE	OKLAHOMA CITY	OKLAHOMA	73135	N
OKD980510788	VISTA POLYMERS INC.	SEC 29 T11N R2W 520*	OKLAHOMA CITY	OKLAHOMA	73135	N
OKD980511299	SOUTHWEST ELECTRIC *	6501 SE 74TH	OKLAHOMA CITY	OKLAHOMA	73135	N
OKD045351350	HENDERSHOT TOOL CO	1008 SE 29TH	OKLAHOMA CITY	OKLAHOMA	73143	N
OK1571724391	TINKER AFB (SOLDIER*	ALC - CC	MIDWEST CITY	OKLAHOMA	73145	F
OKD007188717	DOUBLE EAGLE REFIN*	301 N RHODE ISLAND	OKLAHOMA CITY	OKLAHOMA	73152	F
OKD980749436	RENO ROAD ABANDONED*	1 MI SE OF RENO ROA*	OKLAHOMA CITY	OKLAHOMA	73152	N
OKD065423071	OKLAHOMA TANK SERVI*	3401 S I-35 & SERVI*	MOORE	OKLAHOMA	73153	N
OKD980510846	DEL CITY ABANDONED *	SE CORNER OF 10TH & *	DEL CITY	OKLAHOMA	73155	N
OKD980621731	TEXACO INC OKLAHOMA*	NE 10TH & VICKIE DR*	DEL CITY	OKLAHOMA	73155	N
OKD982554396	ENTERPRISE FOUNDRY	3805 N.W. 36TH	OKLAHOMA CITY	OKLAHOMA	73157	N
OKD067186147	CATO OIL & GREASE CO	915 N EASTERN	OKLAHOMA CITY	OKLAHOMA	73160	N
OKD062270591	PARAWAX REFINERY	700 S IRVING	OKLAHOMA CITY	OKLAHOMA	73160	N
OKD980620843	STATE OF OKLAHOMA H*	2401 N BROADWAY	OKLAHOMA CITY	OKLAHOMA	73160	N
OKD980696439	UNIDENTIFIED SITE-S*	1/10 MI E OF PENNSY*	MOORE	OKLAHOMA	73160	N
OKD987067725	OKLAHOMA GAS & ELEC*	SE 74TH & POLE ROAD	OKLAHOMA CITY	OKLAHOMA	73160	N
OKD980864458	OKLAHOMA CITY DUMP *	SE 29TH & HIWASSEE *	OKLAHOMA CITY	OKLAHOMA	73165	N
OK0570028605	137TH TACTICAL AIRLI*	WILL ROGERS WORLD A*	OKLAHOMA CITY	OKLAHOMA	73179	N
OKD980696785	P & K CO LTD PERMAC*	HWY 75 300 YDS N OF*	HENRYETTA	OKMULGEE	74437	N
OKD980698229	MIDLAND GLASS CO	BOLLINGER RD NEAR H*	HENRYETTA	OKMULGEE	74437	N
OKD982311615	BARTISALL REFINERY	0.75 MI S OF 19TH S*	OKMULGEE	OKMULGEE	74447	N
OKD004998225	BASIN REFINING INC.	1001 N PORTER	OKMULGEE	OKMULGEE	74447	N